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NOTICE TO BINDER.

Volume LIX has been issued in six parts, each consisting of the "Journal" proper, paged with Arabic figures, and "Extracts from the Proceedings," paged with Roman figures. The title and contents should be placed first, and be followed by the six parts of the "Journal" proper, then by the six parts of the "Extracts from the

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ROYAL HORTICULTURAL SOCIETY.

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MASTERS LECTURES, 1933.

PLANTS IN RELATION TO LIGHT AND TEMPERATURE.

By V. H. BLACKMAN, F.R.S.

PART I.—EFFECTS OF LIGHT.

[Read July 18, 1933; Sir John Farmer, F.R.S., in the Chair.]

When I was invited to give the Masters Memorial Lectures it seemed that I might with advantage consider the effects of light and temperature on plants. In such a subject the plant physiologist is keenly interested, while the horticulturist is constantly faced with the reactions of the plant to changes in illumination and temperature. It may be suggested that these two environmental conditions are outside the control of the gardener, but light or shady and warm or cool situations may be chosen in the garden. Furthermore, in the glasshouse temperature may be varied almost at will, and, as I hope to show, the modern development in electric lamps of high efficiency is bringing artificial illumination into the field of practical horticulture.

The subject of light and temperature and their effects on the plant is so vast and many-sided that in two brief lectures only some few aspects can be dealt with.

Although the action of light will be first considered, it may be pointed out that illumination cannot be regarded independently of temperature. There is first the fact that, with sunlight, days of high light intensity are generally warm days. But apart from this the action

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of light is affected by the temperature to which the plant is exposed. One of the lessons which the plant physiologist has learnt of recent years is the "interrelationship of factors," i.e. the interrelationship of the actions of the different conditions of the environment. consider the three environmental conditions (environmental "factors" they are often termed) which are of most importance to the plantnamely, light, temperature and humidity of the air-we find that the reaction of the plant to combinations of such external conditions is very complex. The same intensity of light will have one effect on a plant at a high temperature and another effect on a plant at a low temperature. Similarly the effect of a given temperature will vary with the humidity of the air to which the plant is exposed. The effects of light, temperature and humidity of air are thus closely interrelated. If light and temperature are considered, it is found that for the satisfactory growth of the plant a proper balance between these two conditions is required, just as with the use of fertilizers a proper balance must be kept between nitrogen, phosphorus and potash. the temperature is raised and the light intensity is not sufficiently high an abnormal and spindly type of growth is produced, as is well known.

Action of Light.

In considering the action of light a difficulty lies in its complexity. Sunlight, for example, is no fixed quantity but is always varying,

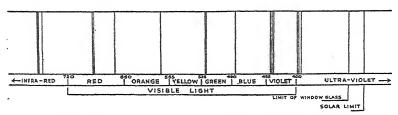


Fig. 1.—Spectrum of Sunlight showing the distribution of the visible, the infra-red, and the ultra-violet parts of the spectrum. The limit of the rays which penetrate window glass is also shown. The numbers indicate the wave-length in millionths of a millimetre. (After J. M. Arthul.)

changing not only in intensity with season of the year, time of day, degree of cloudiness, etc., but also varying in quality during the day as every artist knows. The quality of light is to our eyes a question of colour. The rainbow shows us a succession of colours (red, orange, yellow, green, blue, violet) which when combined gives us the impression of white light (fig. 1). The different coloured rays seen in the rainbow are not the whole of the rays coming from the sun. There are other rays that make no impression of light on our eyes. There are the heat rays, for example, which have a longer wave-length than the red rays, and hence when the rays are split up are found beyond the red, and so are known as infra-red. The heat rays are a very important fraction of the sun's rays, in fact, to use an Irishism, a large part of the

sun's light is not light at all. When the sun is at an angle of 45° (i.e. half up to the zenith), of the rays reaching the surface of the earth 60 per cent. may be heat and under 40 per cent. light.

Ultra-violet light.—In addition to the infra-red rays, we have in sunlight another set of rays which, like the infra-red, give to our eyes no sensation of light; these are the ultra-violet rays, the hygienic properties of which have been so much exploited of recent years. These rays are of shorter wave-length than the violet, so when the sun's rays are separated according to wave-length they lie beyond the violet, hence their name. They are only present in very small quantities in the sunlight arriving at the surface of the earth, for under the most favourable conditions they do not reach more than I per cent. and are generally present in very much smaller quantity. In the sun's light outside the earth's atmosphere it has been calculated that they reach 5 per cent., but most are lost to us as a result of absorption by the blanket of air round the earth.

The ultra-violet rays though feeble in amount are very potent in their action. This is due to the marked chemical effect which they are able to produce in the animal and plant body. It is, of course, not the visible light but a certain portion of the sun's ultra-violet rays which is responsible for sunburn in the human skin, and for the curing of rickets and the formation of vitamins. In fact, they are so powerful that without the screening effect of the atmosphere, the sun's rays would be destructive of all life.

It is well known that the skin does not show sunburn behind ordinary window-glass, and this is now accounted for by the filtering action of the glass, which holds back the larger proportion of the ultraviolet rays (see fig. I). When there came a realization of this defect of ordinary glass, that of absorbing that portion of the sunlight which is of such importance to animal life, investigations were set afoot and glasses were produced of a special composition which had the property of allowing the ultra-violet rays to pass. It should be borne in mind that a glass of this type is only satisfactory when it lets through not merely some but a large proportion of the ultra-violet light falling on it. In addition it is important to note that some of these glasses become "solarized" by exposure to the sun, so that they hold back the rays that they formerly transmitted.

When these new glasses first became available it was suggested that they should be used for glazing greenhouses and frames, so that the plants growing in such situations should no longer be deprived of the major part of the ultra-violet rays which they get in the open. The suggested advantage was based on the assumption that the shorter rays stopped by window-glass were of importance to plants, *i.e.* that plants grew less well in their absence. The question, which is of great horticultural interest, cannot, of course, be settled by analogy with animals, for plants and animals show very great differences in their physiology. The first relevant consideration is, of course, the fact that large numbers of different plants have been grown successfully

behind ordinary glass. It is evident, therefore, that the rays stopped by such glass cannot be essential or even of great importance to such plants. The question therefore narrows itself down to this—do plants grow better when they receive the shorter rays of daylight stopped by window-glass? When put in such a form it is clear that the question can be settled only by careful experimentation, either by using glasses of different transmitting power or by supplying from artificial sources the ultra-violet light which the glass keeps back.

Unfortunately the claim for the importance of ultra-violet light to the plant rests on work of which much is unsatisfactory. The experiments have been often of short duration, have been carried out with few plants, and the conditions, other than the intensity of the light in question, have been poorly controlled. One difficulty in such experimental work in this field lies in the fact that glass that has a high transmission for ultra-violet light is different from ordinary glass in other respects. Such glasses may alter the intensity of the visible light falling on the plant, and in particular they let through more infra-red, i.e. heating, rays. Thus an increase in growth under such glasses may have nothing to do with the transmitting power of the glass for the rays beyond the violet. The most careful work on this subject has been carried out by the Boyce Thompson Research Institute in the United States, and Popp and Bunn have recently issued a review of recent work on the effect on seed-plants of ultra-violet radiation.*

In the Institute referred to, a number of glass-houses were glazed with ordinary glass and with glasses having very various transmitting powers. One glass cut out only the ultra-violet light, another glass transmitted the rays cut out by ordinary glass, another cut out some of the visible violet as well as the ultra-violet, a fourth cut out some of the violet and some of the blue, while a fifth cut out all the violet and the blue and some of the green, leaving only the red-orange with a little green. It was found that there was very little difference between the plants grown under ordinary glass and those under the special glass letting through much more of the ultra-violet of daylight or under that cutting out all the ultra-violet.

Experiments in which ultra-violet light has been supplied to plants from an artificial source (such as those used in health clinics) rich in such rays have failed to demonstrate any advantage. It is, on the other hand, very easy to cause injury by exposure to such a source as a mercury vapour lamp with a quartz envelope or a naked arc light. Siemens, who worked in 1880, and who was one of the first to carry out experiments with plants and artificial light, found that a carbonarc at a distance of a metre or less injured cucumbers and melons; he had therefore to put his plants farther away. He did not realize that the injury was due to radiation of short wave-length in which the light employed was rich, nor that glass would protect from such injury. A mercury vapour lamp at a distance of 15 inches will destroy

^{*} Bull. Torrey Bot. Club, 1933, 60, 161-210.

the upper epidermis of tomato leaves in I minute; in light from such a source there are rays of much shorter wave-length than are found in the sunlight to which we are exposed; it is these rays that cause the rapid injury. What has been demonstrated is that the plant seems very delicately attuned to the quality of ultra-violet light in sunlight. Directly these limits are overstepped, either by using a higher intensity or light of a shorter wave-length than is found in sunlight, then plants are rapidly injured.

We may follow Popp and Bunn in the conclusion that it has not been demonstrated that ultra-violet light is of importance to the growth of plants, and that any excess of such light rapidly causes injury. It does not follow from this reason that plants may not grow better under some of the special glasses which are more transparent to rays of short wave-length than ordinary glass. Any improvement observed may, however, be due to the fact that the glasses in question affect the transmission of rays other than the ultra-violet. It is evident, however, that for plants there is no special "magic" in such light. A slight addition of ultra-violet—and any large addition is injurious—cannot make up for the low intensity of natural light characteristic of the winter months in this country.

It has been shown that ultra-violet light has an effect on the development of the red (anthocyanin) pigment of plants. J. M. ARTHUR has shown that apples can be coloured by exposure to the rays from a quartz mercury vapour lamp, the distance being such that injury is avoided. In the case of 'McIntosh' apples an exposure for a length of 40 hours was necessary, so that the process is not likely to be an economic one.

The Heat Rays.—The infra-red rays at the other end of the spectrum to that of the ultra-violet may be quickly dismissed. They are heating rays, and their direct effect on plants is very slight or nil. The infra-red rays of sunlight are, however, of great importance in affecting the temperature to which the plant is exposed.

Visible Light.—Since the ultra-violet and infra-red rays are of such slight importance in plant growth, it is evident that it is the visible part of sunlight that has the most effect. It is perhaps fortunate that this is so, as it enables us to get directly some measure of the suitability of a light for plant growth. We judge a light by its brightness, i.e. by the amount of the rays which give to our eyes the sensation of light. As the plant and the human eye respond to the same rays of light, we can assume, within limits, that a brighter light is more suitable to plants than a dimmer one. Our measure of brightness is, however, purely subjective. This is shown when we compare the brightness of light of different colours. To the human eye yellow-green light is the most effective in inducing the sensation of brightness. If, for example, the eye is exposed to red, to green, and to blue light which are of equal intensity on a physical basis of measurement, then the green will seem brighter than either of the other two. Thus lights to an eye of equal brightness may have a very different composition,

and we cannot say that the plant responds to light in the same way as does our eye. We know no plant-physiological process in which green light is the most effective, and for assimilation of carbon dioxide redorange light is the most potent. For satisfactory growth the plant requires both the red and the blue part of the spectrum.

Light affects plants in numerous ways, many of which are, no doubt, still unknown to us. There appear to be three main effects: (a) that on the production of chlorophyll and of food materials in the leaves; (b) that on the rate of growth of stems and leaves; (c) that on the form of the plant. For the assimilation of leaves the rays of longer wavelength are of more importance, as already stated. For the effect on the growth rate the blue half of the spectrum is by far the more effec-

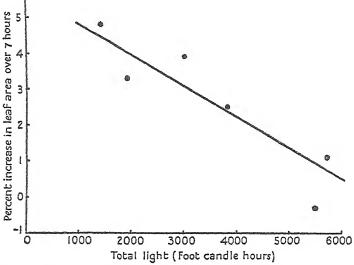


Fig. 2.—Diagram showing for the Tomato the relationship of leaf-area to light received over a period of 7 hours. The increase of leaf-area falls as light increases.

tive; red light has little more effect than darkness. It is one of the seeming paradoxes of plant physiology that although light is necessary for the proper development of plants, and that within limits they develop better in a bright light than a weak one, yet, on the whole, light has a retarding effect on the growth rate. Of the 9.65 feet by which a bamboo in the tropics increased in length during 14 days, only 38 per cent. was by day.

The effect of weak light in producing long spindly plants with a large leaf-area, and of strong light in producing short, sturdy plants with a smaller leaf-area, is well known. Again, if an organ has only a limited period of growth, a bright light may not only reduce the size to which it attains, but cause it to complete its development in a shorter time. The blue rays are the important ones in controlling the form of the plant. Plants grown in red light are very abnormal, resembling those grown in darkness.

The close relationship between light intensity and leaf-area is shown by a physiological study of the tomato plant, which is now in

progress at the Cheshunt Experimental Station, by investigators from the Imperial College of Science and Tech-Fig. 2 shows that the increase in leaf-area which took place during a period of seven hours decreased with increase in light intensity from 1,000 to 6,000 foot candles. Fig. 3 shows that in the same plant the gain in dry weight of the plant due to the manufacture of food material rises to a maximum between 4,000 and 5,000 foot candles and then falls off as the light in-

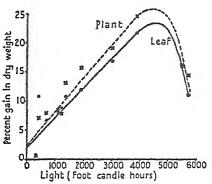


Fig. 3.—Diagram showing for the Tomato the relationship between percentage gain in dry weight and increasing light. There is an optimum at about 4,500 foot candle hours.

tensity increases.* There appears to be an optimum which is comparatively low, since the brightness of full sunlight may be of the order of 20,000 foot candles.

Total Light Intensity.—Every gardener knows that certain plants grow better in the shade than if exposed to full sunlight. Experimental work carried out at the Boyce Thompson Institute shows that a number of plants which do well in full light seemed under these conditions to have more light than they could use. This Institute carried out most elaborate experiments on the effect on plants of variation of total light intensity and on the effect of different coloured lights. The plants were grown (a) both in the open and in the greenhouse, under shades that reduced the intensity without altering the quality of the light, (b) in greenhouses with glasses which cut out either the blue end or the red end of the spectrum, and (c) under artificial light. In the experiments with artificial light it was found that plants such as Geum, Galinsoga and Buckwheat would survive for 40–50 days in light as weak as 40–25 foot candles. Sunflower was the only plant investigated which did not survive in an intensity of 46 foot candles.

With daylight the rate of growth (as measured by increase in dry weight) was almost proportional to the light intensity up to 20–30 per cent. of full summer sunlight. Above 50 per cent. intensity, growth increases very little with increase of light. Galinsoga, when grown in the open in June, July and August, showed as great a dry weight under a shade cutting off 80 per cent. of the light as with full daylight, and, similarly, Sunflower and Tobacco showed little differences under the same two conditions, *i.e.* with one light intensity five times the other. The physiological basis of such a striking result is no doubt the low concentration of carbon dioxide in the air, so that the light is

^{*} Bolas and Melville, Annals of Botany, 1933, vol. xlvii. pp. 673-88.

in excess of the plant's productive capacity. The results certainly suggest that the reaction of plants to shading, which can be easily achieved with cheese-cloth, should be more fully explored in horticultural practice. When light quality was studied it was found impossible to grow plants in light deficient in blue rays, though it is possible to grow them in light deficient in red rays.

Measurement of Effect of Light on the Growth Rate.

It is not an easy matter to get a quantitative measure of the effect on growth of light of different intensities. If a certain light intensity produces a bigger plant with a larger leaf-area, then such a plant becomes a more efficient machine for absorbing light than a smaller leaved plant. Any increase in the leaf-area of a plant thus gives it a greater efficiency in food production; this will increase its growth rate still further, and the still greater leaf-area will again accelerate growth. In other words, the bigger the plant-other things being equal—the greater its increase, i.e. the amount of material added is dependent on the amount already present. This means that the plant works on the compound-interest principle. The obvious measure of the plant's activity is thus the rate of interest, an interest, however, which is not added annually or monthly, or even daily, but is added continuously. By following from day to day the increase (in dry weight or leaf-area) of a plant this rate can be calculated in a comparatively simple mathematical way. Another, and still simpler, measure of the rate of compound interest is the time taken for a quantity, such as a sum of money, to double. On this basis we can obtain a measure of the rate at which the plant is adding new material by determining the time taken to double its weight.

This compound-interest principle has been applied in studies of the effect of light on the growth of Duckweed (Lemna minor). This plant has the advantage of developing in two dimensions only, i.e. as a surface layer on the water. It is thus peculiarly fitted for experiments with artificial light, since the distance of the plant from the light remains constant. Duckweed has the further advantage that it develops vegetatively by budding, so that counting at intervals the number of fronds gives a measure of the rate of multiplication, i.e. of the rate of growth. From what has been said above it is evident that the time taken to develop a certain number of fronds, say 100, is not a satisfactory measure of growth since the number of new fronds produced will depend on the number already present. The time taken to double the number of fronds is, however, independent of the number with which one starts and is a measure of the rate of interest, i.e. of the rate of growth.

Fig. 4 shows a photograph of a Duckweed culture which was started (at day o) with 10 fronds; on the second day they had become 18; on the fourth, 39; on the sixth, 69; and on the eighth day, 153 fronds. It is seen that as the fronds grow in number the number





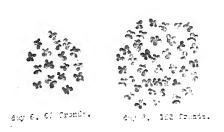
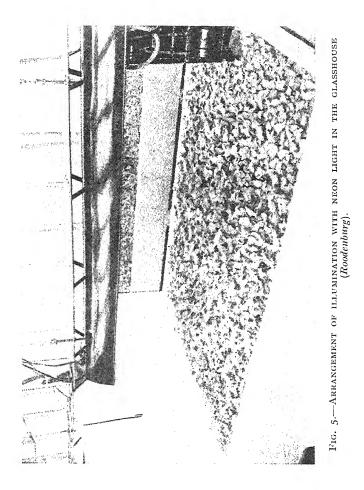
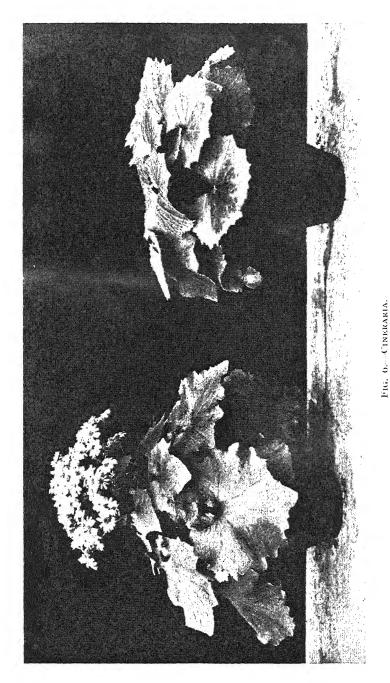
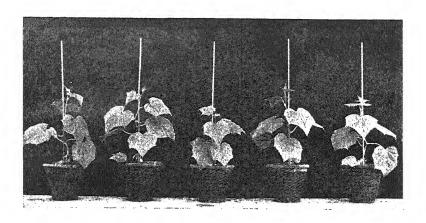


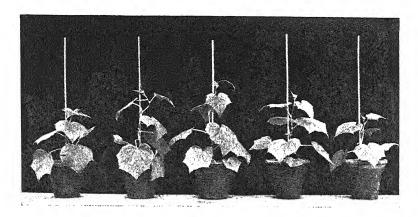
Fig. 4.—Fronds of Duckweed (Lemna minor) in a colony at 2-day intervals.





Plant on right grown without artificial light. Plant on left illuminated with neon light for 48 days. (Photo Dec. 28, Roodenburg.)





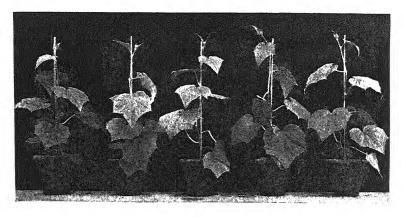


Fig. 7.—Cucumber Seedlings.

Above, control plants; middle, plants exposed to neon light of 45 c.p.; below, plants exposed to neon light of 90 c.p. Exposure 47 days. (Roodenburg.)

of individuals formed in two days goes up. This is shown more clearly in Fig. 8, where the height of the blocks shows the number of fronds developed during 9 successive days of growth; it demonstrates very clearly the compound-interest principle. Table I shows results of an experiment using artificial light. As the brightness of the light

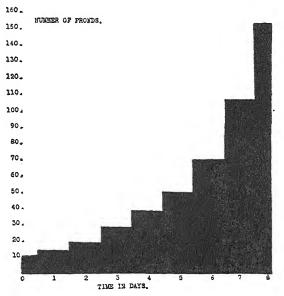


Fig. 8.—Diagram showing the relationship between time and number of fronds developing in a colony of Duckweed.

increases from 280 to 1,000 foot candles, there is a decrease in the number of hours required for the fronds to double in number; the time required at the higher intensity to that at the lower is as 2 to 3. The rate of interest, *i.e.* the rate of growth, has gone up 50 per cent., or the rates at the two intensities are inversely proportional to the time and so are in the ratio of 3 to 2.

TABLE I.

Time required for the Doubling of Frond Number in a Colony of Duckweed, under Different Light Intensities.

Light Intensity (Foot candles).	Time (Hours)
1,400	68·o
1,000	67.9
750	72.4
550	75.3
280	103.0

Above 1,000 foot candles the growth rate does not increase, for the difference between 1,000 and 1,400 foot candles is negligible. We meet the very interesting fact that the optimum light intensity for

Duckweed is a comparatively low one of about 1,000 foot candles, while for another strain of the same plant it was even less. The low optimum for a plant often exposed to direct sunlight is rather surprising. It has, however, been pointed out above that many garden plants appear to grow well in a light which is only one-fifth of full daylight.

The Use of Artificial Light.

In these latitudes the length of day varies between 8 and 16½ hours, and in the winter months plant growth is severely limited, not only by the short day, but also by the low level of natural light available. At such seasons the satisfactory growth of plants is not possible, even in glasshouses where a suitable temperature can be obtained at will. The question of using artificial light to supplement daylight naturally arises. Siemens in 1880 seems to have been one of the earliest to use electric light—in the form of the carbon-arc—in horticulture. It is only, however, of recent years—with the cheapening of electric power and the improvement of electric lamps—that the use of artificial light has become an economic possibility.

Advantages of Artificial Light.—Artificial light sources may be used for a number of purposes. (I) In breeding work with plants it is often of importance to obtain successive generations in as short a time as possible. In continuous electric light wheat may be made to produce fertile grain in a growing period of only 60-70 days; two generations may thus be obtained in the winter and four during the year. The view that continuous light is necessarily injurious and that plants require a resting period is based on a false analogy with man. Some plants, such as wheat, grow perfectly well without periods of darkness, others, however, will not tolerate such conditions. (2) Artificial light may be used to lengthen the daily period of illumination so that "longday" plants may flower during short days. (3) Light from artificial sources may be used to supplement the light deficiency of the spring months. The leaf-area may thus be increased so that the plant is able to take fuller advantage of the brighter days when they arrive. It starts with an advantage over the normally illuminated; on the compound-interest principle it has a larger plant capital on which to earn interest.

Nature of Artificial Light to be Used.—We do not know the best illumination to which a plant should be subjected. It varies no doubt with different plants and with the same plant at different stages of its growth. As plants have been developed under conditions of daylight, it seems natural to assume that an artificial illuminant suitable for plant growth should give a light as similar as possible to daylight. Such an assumption is of very doubtful validity. It is unlikely that the plants' requirements run parallel with the sensitivity of the human eye.

When we consider artificial light sources we are faced with the very low efficiency of most of them. The ideal light is a "cold light," i.e. one in which all the energy used appears as visible rays. Neither the sun nor any artificial light source has achieved this; it is only among living organisms that it is attained. The diagram in fig. 9 shows that the whole of the radiation emitted by the firefly is in the visible part of the spectrum, there is none in the infra-red or the ultra-violet. Unfortunately the light of the firefly is so weak that it would take I,600 to give a light of one candle-power. In the same diagram the area enclosed below the long curved line measures the energy emitted by an ordinary filament lamp. It is seen how small a part of the area falls within the visible part of the spectrum. This is seen still more clearly in fig. 10 where the large black area represents the heat energy of an incandescent (filament) lamp, the small black

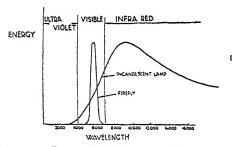


FIG. 9.—DIAGRAM SHOWING THE DISTRIBU-TION OF ENERGY IN THE LIGHT OF THE FIREFLY AND OF AN INCANDESCENT LAMP. THE AREA ENCLOSED WITHIN THE CURVED LINES GIVES A MEASURE OF THE ENERGY. THE WAVE-LENGTH IS GIVEN IN TEN MILLIONTHS OF A MILLIMETRE.

FIG. 10.—THE SPECTRUM OF LIGHT OF AN INCANDESCENT LAMP. MOST OF THE ENERGY IS IN THE INFRARED (HEAT RAYS) AND A MINUTE AMOUNT IN THE ULTRA-VIOLET. BOTH OF THESE ARE SHOWN IN BLACK. THE VISIBLE LIGHT IS THE UNBLACKENED PART.

area on the left the ultra-violet light, while the unblackened central portion represents the energy emitted as visible light. It is clear how small a part of the electrical energy used appears as useful light, nearly all is wasted in heat. In Table II a very approximate comparison of the output of visible rays of a number of light sources is given. (The data for the lamps I owe to the General Electric Co. Ltd.) It is seen how poor in light rays are the artificial sources in comparison with the sun.

TABLE II.
Sources of Illumination.

					% of Energy as Visible Rays.
Sun (outside atmo					52
Sun (earth's surfa	ce, 4	15°)	•		40
Filament Lamp		•			3–6
Neon Lamp	•	•	•		5
Sodium Lamp					10-15
Osira Lamp .				•	12

A better measure of the efficiency of different lamps is the number of lumens (a lumen is a measure of brightness) per watt (unit of energy) used by the lamp. This is shown graphically in fig. II. It shows how marked has been the increase in efficiency as the electric

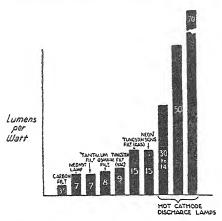


Fig. 11.—Diagram of the Efficiency in Light Production of different sources of artificial light. The lumen is a measure of brightness.

lamp has been developed. The gas-filled filament lamp all of us familiar to domestic lighting, and the red, tubular, neon lights are the common advertising signs of the streets. The "hot cathode" lamps are high-efficiency lamps, employing various gases, such as sodium, which are now being developed in this country and elsewhere. The newer gas lamps do not give a continuous spectrum, i.e. a more or less white light, as is given by the sun and the incandescent filament lamp, but light of various

special colours, according to the gas used; they are, however, of much higher light efficiency.

Experiments with Artificial Light.

Considerable experimental work has been carried out with artificial light in greenhouses, including that at the Cheshunt Experimental Station in this country which is still in progress. Some of the most elaborate are those undertaken by SVEN ODÉN and his co-workers in Sweden, and by ROODENBURG at Wageningen in Holland. recommends that filament lamps should be run a little below their normal voltage. This increases the life of the lamps and gives a light which has a higher percentage of red and infra-red. Such a type of light favours the flowering of some plants (e.g. Convallaria majalis). This worker also gives the cost of various types of electric light installations in greenhouses. In all cases reflectors must be employed, otherwise a large portion of the light of the lamp never reaches the plants. For the intensive cultivation of vegetables during winter he recommends a light intensity of 380-700 foot candles, using large incandescent lamps; for use in the morning and evening during spring and winter, to obtain the optimum light of day, an intensity of 100-350 foot candles; and for the illumination of cuttings and of seedlings in their early stages, 27-100 foot candles.

ROODENBURG (Kunstlichtcultur I and II) has used very largely the neon discharge tube, the elongated tubular form of the lamps allowing an equal distribution of the light to be much more easily attained than with filament lamps. The deep red light of these lamps induces a well-developed foliage and a deep green colour. Fig. 5 shows ROODENBURG'S arrangement for illumination with

such a lamp. The actual lamp is hidden by the elongated reflector. In fig. 6 are shown the results of neon lighting of Cineraria multiflora var. nana. The plants were placed in large pots on October 28, and illuminated on November 9 with an intensity of 45-90 foot candles, the temperature of the house varying between 55° and 64° F., and the humidity being about 90 per cent. The illumination was given for 8 hours each night, from 10 P.M. to 6 A.M. The first illuminated plant came into flower on December 5, and the buds began to open on December 8. By December 28, when the photograph was taken, the plants were in full flower. In the control plants, receiving daylight only, the first blooms appeared on two plants on December 30, i.e. 25 days later than the illuminated. A similar experiment with cucumber seedlings showed a marked increase in development of the seedlings both with weak (45 c.p.) and strong (90 c.p.) illumination (fig. 7). The illumination began on November 12 and continued for 47 days, i.e. a total of 400 hours. The photograph shown in fig. 7 was taken on December 29. The more strongly illuminated plants came into bearing first on March 12, and by the first week in June had produced a total of 40.9 fruits per plant, the weakly illuminated giving 43.3 and the control 35.2. The increase in fruit was 23 per cent. (21 per cent. for first quality) for the weaker light and 16.2 per cent. (14.5 per cent. for first quality) for the stronger light. Another experiment carried out on a larger scale gave an increase in first quality cucumbers of 16.7 per cent. On adding to the cost of the current one-fifth of the cost of the installation, the value of the increased yield was 25 to 100 per cent. above the total cost of the artificial lighting.

It is not proposed to deal here with the subject of photoperiodism, the effect of length of day on the flowering of plants. The effects are very striking, but the mechanism is ill understood. As has already been pointed out, the use of artificial light enables one to increase the length of day and so bring about the flowering of "long day" plants during periods of short days. A further reference to photoperiodism will, however, be made when dealing with the effect of temperature on the time of flowering.

[Figures 9, 10, and II are reproduced by kind permission of "The Illuminating Engineer" and the General Electric Co.'s Journal, and figs. 5, 6, and 7 from Kunstlichtcultur I and II by Dr. J. D. M. ROODENBURG by kind permission of the author and the Director of the "Laboratorium van Tuinbouwplantenteelt" Wageningen.]

THE ROCK GARDEN AT KIRNAN, ARGYLLSHIRE.

By R. H. MACAULAY.

THE Kirnan rock garden in Argyllshire owes nearly everything to Nature: its fine setting in an amphitheatre of broken hill tops and its natural rock, which is, partly at least, micaceous schist, but with a good deal of variety, being in some parts hard, grey rock, in others soft, disintegrated rock, or again flaky rock in which saxatile plants find a happy home.

It is large in extent, its length over all more than 250 yards, its width variable but round about 35 yards. The rock is not continuous, there is a bold frontage for a considerable distance, some of it in its natural state and some of it broken up into cliffs by the quarrying of farmers wanting stone to build their walls; above this there are outcrops of rock linked together by stretches of grass or heather. At the far end the rock becomes more obviously micaceous schist and terminates in an upstanding rock of fine shape, at the foot of which there is a natural well which supplies the house with drinking water. In one part of the garden a stream led over the rocks through a series of pools does something to add to the beauty of them. The rock garden has been made by removing the overburden from any rock which showed an outcrop (fig. 12) and cleaning out the endless pockets, mostly deep and all of them with so free a drainage that no water lies in them for any appreciable time. The rock garden, as it now is, has grown up very gradually, the first small beginning was made in 1915, and the latest addition made only two years ago; I think it has reached its limit, but I cannot be sure. The climate is reasonably mild, but not so mild as those places which are actually on the sea-coast of Argyllshire. Situated as the garden is about six miles from the sea, it is liable to pretty hard frost, but long frosts are infrequent and comparatively tender plants will survive here if a little care is taken to give them the shelter of an overhanging rock. The annual rainfall is about 60 inches.

The garden, which faces south-east, being large lends itself to bold planting, and such shrubs as Desfontainea spinosa, Tricuspidaria lanceolata, Eucryphia Billardieri, Embothrium coccineum, Itea ilicifolia, Osmanthus Delavayi, Olearia semidentata, and Telopea truncata have not so far been found too large for it. In more than one place Pinus nobilis has insisted on having a footing in it, but having seeded itself in hard rock shows no sign of outgrowing its place (fig. 13). The effective placing of evergreen shrubs such as the smaller forms of conifers, Junipers, Cotoneasters, which is very necessary if the rock is to look clothed in winter, is bound to present a certain amount of difficulty, because roots are so apt to invade pockets of choice plants:

but the difficulty has been overcome to some extent by placing them in rock-bound pockets, where their growth is checked and their roots kept within bounds. The roots of flowering shrubs do not seem to be so troublesome. The general planting of so-called "alpines" follows familiar lines. To produce a good colour effect on a large rock garden our old, well-tried friends are the most useful; we gradually make new friends, and some of them prove real additions to the beauty of the garden, while others never make a great show though the successful cultivation of them may give us special pleasure. We have at one time or another introduced a very large variety of plants, most of which could, I think, still be found, though some will have perished by the way; whatever number we may have, there are still very many good plants which we have yet to get; but who can keep pace with the ever-growing list of new introductions? One aim which we keep before us is to maintain a show of flowers over a long season; we manage to keep the garden fairly bright from March to November, and as the season draws to an end the autumn colouring of shrubs adds to its beauty.

I think that I may fairly claim that plants generally respond well to the micaceous soil and perfect drainage. Daphne Blagayana, D. Cneorum, D. rupestris grandiflora, Rhodothamnus Chamaecistus, Jeffersonia dubia, Lithospermum Gastonii, Phyllodoce aleutica, Gentiana bavarica, and some of the Celmisias deserve, I am told, honourable mention for their good growth; but if I were asked to pick two groups which are specially suited to our conditions I should name the Asiatic Gentians and the Cyananthus tribe.

Gentiana sino-ornata and the hybrid $G. \times Macaulayi$, mainly planted in drifts at the foot of rocks, make a brave show, and have a long season. I have had plants of $G. \times Macaulayi$ flowering in the last days of July and G. sino-ornata carrying on well into November, till rain and frost bedraggle it. G. Lawrencei thrives well in several good-sized patches, and is, to my mind, a finer thing than G. Farreri. With bees always busy among them, these Gentians hybridize freely, and we have hybrids of almost every shade of blue, among them a fine light blue (probably G. Lawrencei \times G. Farreri), which is, I think, a worthy rival of G. Farreri. I will not enumerate all our other species of Gentians; some are easy and freely used, some such as G. ornata, G. Kurroo, G. hexaphylla, and $G. \times hexa$ -farreri are so far only represented by a plant or two, some are of no great garden value, and others have not had time to show what they can do. A self-sown hybrid (probably G. Veitchiorum × G. sino-ornata) is distinctly good, and G. Lawrencei × G. Veitchiorum is a nice thing. Two hybrids given to me by a friend are interesting; one of them, G. sino-ornata \times G. Farreri, seems to be practically an early-flowering G. sino-ornata, and a seedling of G. hexa-farreri, presumably with a cross of G. Veitchiorum, bears flowers exactly like G. Veitchiorum with the foliage of G. hexaphylla, and is much more floriferous than G. Veitchiorum ever is with me.

The Cyananthus family are rather special favourites of mine. My

oldest plants of ordinary C. lobatus must be more than 15 years old, and are massive specimens with a great profusion of flower. The newer and larger form of Cyananthus lobatus (K.W. 5949), henceforth to be known as Cyananthus lobatus insignis, is especially effective in a mass. The other forms of C. lobatus are also good, and well-grown plants of C. Delavayi and C. incanus leiocalyx in full bloom are a fine sight. The Cyananthus tribe obviously finds something to its liking in the Kirnan conditions, but I am not prepared to be dogmatic about all its requirements. It is, I am sure, intolerant of drought and likes to feel a little dampness about its roots, so long as the drainage is sound. It makes a long, fleshy root stock, and I try to give it a deep root run in open and preferably rather stony soil. The varieties of C. lobatus seem to be the easiest to grow, and I have grown them in almost every part of the rock garden, though not exactly in the "sunny chinks," which ROBINSON recommends for them. They have not succeeded equally well everywhere, but I have not always been able to guess why one plant has grown well and another in an apparently similar position has rather disgraced itself, unless it be that in some cases the plants have not found free enough root run at depth. It also occasionally happens that a plant will suddenly "go off" for no apparent reason while its companions round it are perfectly healthy. The other species of Cyananthus are doing best at the foot of rocks where there is a little natural dampness, so that the soil at their roots never gets quite dry. They all vanish underground in the winter, and the weeder in early spring must be a little careful how he plies his tool, but if they escape injury from this and garden pests they seldom fail to reappear in the spring. I take the precaution of putting a glass in winter over some varieties such as C. Delavayi, C. longiflorus, C. incanus and C. microphyllus, but I do not know whether they need it or not. C. Wardii certainly looks as if it would dislike winter wet, and being a newcomer has not so far ventured itself outside the Alpine house, where its long, trailing flowers hanging down over the edges of its pots are very attractive.

Saxifrages and rock Primulas find a good imitation of their natural home in the micaceous schist, where they can get their roots well into the rock and need fear no winter wet.

Other Primulas and Meconopsis flourish well at the foot of the rock round the well, which keeps the ground about it pleasantly damp, and make a fine show. I cannot boast marked success with those which are reputed to be difficult. Some, no doubt, we maltreat; others, I fancy, have no intention of living long however well we treat them. Primula nutans, for example, has so far declined to be firmly established. Of the latest arrivals one with deep crimson flowers, which comes under the name of P. Pantlangii, is specially attractive. P. Winteri, under overhanging rocks, is quite happy. Of the numerous Meconopsis tribe Meconopsis quintuplinervia, growing in wide drifts, is a special favourite, if only because it is a hearty perennial; but the most beautiful of all is, I consider, M. simplicifolia Baileyi,

Fig. 12. Top of the Rock Garden at Kirnan as it was in 1913.

[To face p. 10.



Fig. 13.—Pinus nobilis and Juniperus communis compressa.

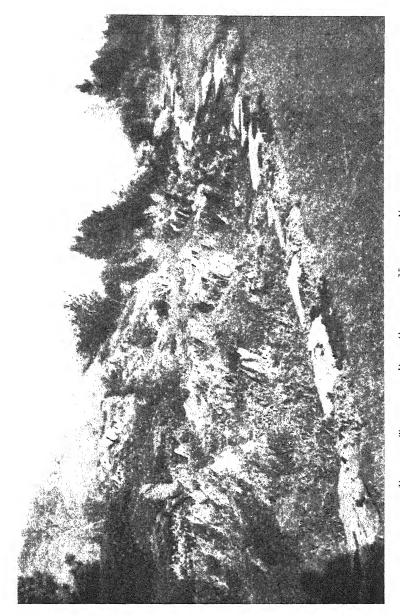


Fig. 14.—Top of the Rock Garden at Kirnan in November 1933.

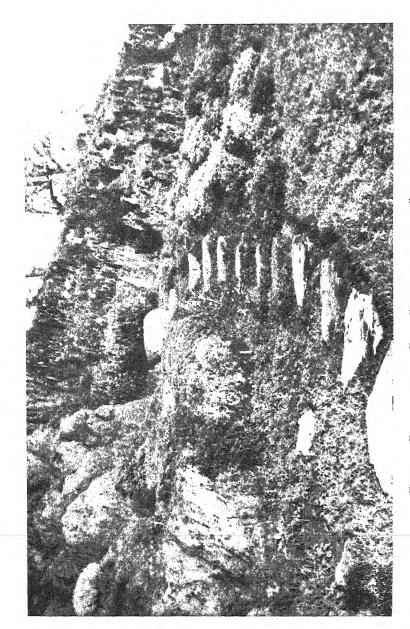
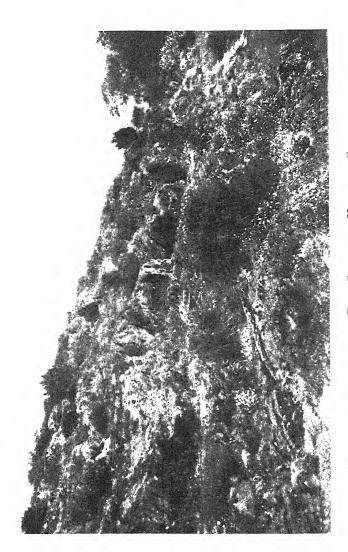


Fig. 15.—Rock at end of Rock Garden—a home of Saxifrages.



FIG. 16,--ROCK GARDEN FROM THE LILY POND.



[To face p. 17. Fig. 19,—A Corner of the Rock Garden at Kirnan in Summer.

usually, but not always, a biennial. Of the Omphalogrammas we have so far only two species, O. vincaeflora and O. elegans, and these are not yet quite an established success. I feel that we ought to make a success of Nomocharis, but this is yet to come. Bulbs are as a rule no success here; I don't think that our Argyllshire climate agrees with them. In spite of this we maintain a nice little patch of Tecophilaea cyanocrocus under an overhanging rock, but it is only done by taking up the bulbs as soon as the leaves die down and putting them away in dry sand till the end of October.

One pleasant feature of our natural rock is that plants of many sorts seed themselves into the rock itself. Gentians, Aquilegias, Anenomes, Erinus, Veronicas, *Erigeron mucronatus, Erythraea diffusa*, Hypericums, and even Shortias make their way into invisible cracks, and there is very little rock so hard and impervious that it will not have a clothing of heather and thyme.

For filling up the sometimes wide spaces which lie between the outcrops of rock we rely partly on grass lawn, partly on heathers in variety, and dwarf Rhododendrons, of which there is now such a bewildering variety. A few of the larger Rhododendrons find a place on the outskirts of the rock, and here and there a little belt of conifers provides background and shelter.

I wonder whether all this will give anyone who has not seen the garden any real idea of what it is like. It is rather a far cry to Argyllshire, but I hope that anyone whose interest is aroused by my attempt to describe it will, if he or she is passing this way, turn aside and have a look at it.

SOME IMPORTANT CONSIDERATIONS IN MODERN COMMERCIAL FRUIT PLANTING.

By R. G. HATTON, M.A., V.M.H.

[Read September 12, 1933; Sir Daniel Hall, F.R.S., in the Chair.]

Just when the expectations of the fruit-growing community of this country are being aroused by a succession of events which were bound to affect them profoundly, everyone is waiting for some authoritative utterance as to the prospects of future stability and livelihood in various branches of the industry. Conferences, with their flitting shadows of tariffs and quotas, Marketing Acts and Schemes, a youthful and exuberant canning industry the rumoured future demands of which exceed our wildest dreams, a considered campaign and authoritative pronouncements from headquarters to encourage the growing of more and better fruit of certain types, especially an increased area of dessert apples, and well-meaning books and magazine articles, inspired we hope by a genuine enthusiasm to encourage fruit growing, exaggerating the promise of a handsome living from intensive cultures for anyone who thought he had brains, without sufficiently emphasizing the attendant difficulties and uncertainties-all these and many other influences have contributed to concentrate interest on prophecies for the future rather than on principles of production.

At the outset, I wish to emphasize that I am not gifted with prophecy, and am incompetent to gauge the vagaries of the market and the political situation, and therefore must refuse to deal with this aspect of our industry. Although at the moment it is the fashion for the politician and a useful excuse for the economist to refer the world's present ills to the rapid advances of science and research in the region of production, instead of to their own lack of imagination and foresight in organizing better distribution in a world as yet all too far from replete, it is of the advances in horticultural science over the last twenty years and of their practical application to modern commercial fruit planting that I propose to speak, feeling, as I do, that this is the only sound remedy for present ills. I believe that the advances made in our exact knowledge of everything pertaining to fruit-growing have made our chances of success at least 100 per cent. more likely than they have yet been, provided we will study those facts carefully, interrelate one with another, and not only begin to realize their existence seriously after we have bought our land and material and already embarked upon some fantastic experiment. Experimentation is apt to be pretty costly, and without any feelings of professional jealousy I suggest it should be left to the trained investigator, to the grower already well established by proved methods, or to the amateur not pretending to be seeking a living in the industry.

Quackery is apt to follow close on the train of discovery and in the case of fruit-growing this has been no exception. I say this advisedly, because East Malling and, I have no doubt, our sister Research Stations are the Mecca of many a pilgrim—with his pseudo-Koran tucked under his arm—expectant of a promised miracle and an impossible blessing—and it is our unpleasant duty to set before him a list of much more mundane considerations and to outline a much steeper and slower road to success, if he is not too impatient.

Although research has still a great deal to tell us, not necessarily along the lines of the now hackneyed phrase of making two apples grow where only one grew before, it is now within our power in this country to grow and present to the public a range of deciduous fruits which in appearance can hold its own with any in the world, and in flavour and quality is pre-eminent. This must surely afford the sound foundations for an industry if it can be encouraged unhampered to develop along the lines now so clearly marked out as a result of the combined efforts of the investigator and the administrator.

Whilst it cannot be disputed that the last twenty years' research has increased production, that increase must very largely be one of marketable and high quality produce at the expense of a mass of poor and unsaleable fruit. It has effectively stemmed the annual wastage of capital in the planting up of completely useless material and the development of equally unsuitable land. It has made even the best grower's expenditure on spray fluids and dusts vastly more effective, and has placed within his grasp economies and efficiency in the use of his manures and adaptations of his methods of cultivation hitherto undreamt of. It has given him an intimacy with standardized material and principles along which to handle it, which knowledge he could only obtain previously by experience costly in time and money. The time, I believe, is not far distant when 'Cox's Orange Pippin' will be profitably grown as the apple for the consumption of the masses and not only for the decoration of the banqueting table. Twenty years ago it was considered a gamble to attempt to grow it, and I have seen hundreds of acres "top worked" to "commercial" varieties! Yet to-day some of us are, I think, unnecessarily disturbed at the possible over-production of this justly prized fruit.

Horticultural research can rightly claim that its main contributions are all pointing to a more economic production, *i.e.* making two better apples grow with the same capital and energy which grew one before, and that the salvation of the industry is along this road rather than by the encouragement of artificially high prices. How then has modern commercial fruit-planting been affected? Let me take in order some of the most important considerations.

I. THE SOIL AND SITE.

The Fruit Soil Surveys, initiated by the far-sightedness of the Ministry of Agriculture, in the West Midlands, and in East and South-East England, in collaboration with the Provincial Advisory Centres and the adjacent Research Institutions, have already been carried

far enough to show how both the potential planter and the established grower can benefit from our advances in knowledge. To the established grower the mysteries of his "high lights" and his "weak spots" have in the vast majority of cases been explained. He can be told whether amelioration is both possible and economically worth while, and whether it would come through drainage, manuring, or an adaptation of cultivation methods. Unfortunately, he has not infrequently to be told that the cheapest way out is to cut his losses indeed, that the particular spot should never have been planted up, and that if he persists he will only throw good money after bad. Here then is the first sine qua non for the would-be commercial fruit-planter to-day. He must know the potentialities of his soil or, more accurately, of his soils, for they will probably differ not only from field to field but within a single field, and he may be faced with having to decide whether the proportion of suitable ground sufficiently outweighs the weak spots to justify his planting at all. The fruit-grower has definitely come to stay, probably to put not less, and possibly a good deal more, than £200 an acre into his permanent fruit before he sees any profits. The Fruit Soil Surveyors have made a good start at correlating soil type not only with fruit-tree growth performance but with kind and variety of fruit suitable and its response to different types of cultivation—yet to-day men, wise and skilled in other walks of life, are still airily waving their hands over a field or even a whole farm and proposing to plant it up with "fruit"!

At the moment when there is a revived interest in, and an impetus given to, fruit-growing in this country, it is a thousand pities that these basic and fundamental investigations should have, to all intents and purposes, been closed down on the plea of national economy. Every day this correlation work added to that store of knowledge from which the investigator could draw, enabling him to advise the would-be planter and so to reduce the many acres that are annually being planted up and assiduously tended—though doomed to failure from the first. That the already over-burdened County Horticultural Officers are rapidly exchanging their walking-sticks for soil augers is indeed a good augury, and no modern commercial planter should start on his venture without enlisting all the help and experience he can to make a detailed survey of his proposed sites.

This has become all the more important in view of the fact that the one-time accepted fruit-growing areas have become more and more congested. The result is that newcomers often have to take up inferior patches of ground or else become pioneers in an entirely fresh area. Those who have been brave enough to pioneer have during the past twenty years contributed in no small measure to the knowledge of fruit-growing possibilities in this country. At one time, when top fruit, soft fruit and market garden crops were inextricably mixed up together, it was generally agreed that only the best—and most expensive—loams were suitable for horticultural purposes, but this doxy has unfortunately outlived the generally pernicious practice, yet

to-day we find some of the healthiest fruit-trees, bearing the best quality crops within a reasonable period of time, upon soils varying from sands reclaimed from heath and bracken to heavy clays not so long since passed over as sterile and unfitted for any crop. These demonstrated facts have led the novice to the dangerous conclusion that fruit can be grown commercially almost anywhere, and though the good work which would have explained and guided these new developments is momentarily curtailed, these new developments have been under observation sufficiently long for us to appreciate that such areas are usually successful as a result of specialization, of a high standard of knowledge and skill and of a utilization of all the methods of amelioration and control available to the modern fruit-grower. Some soils will grow almost any kind of fruit plant well-much of our land at East Malling is, perhaps fortunately, in this class—but such ground frequently does not yield high quality fruit unless it is subjected to special manurial and cultural treatments. It may be admirable for the production of wood growth and large culinary fruit. Other land is naturally adapted for high quality dessert fruit. There are areas marked out par excellence for small fruit-growing where nearly double the "average" tonnage can readily be produced or where early maturity can command specially remunerative prices. This is an era when there is a very ready limit to the "luxury trade," for the 6d. and is. apple; we must increase the consumption amongst the masses. In producing the bulk of our soft fruits we must cater for the reasonable canning contract. In other words, we must make every use of soil and climatic advantages to enable us to grow the heaviest and most saleable crops economically at remunerative vet popular prices.

Our knowledge of climatic conditions as affecting fruit is as yet all too elementary, but in practice many of us have learned the dangers of exposure to the east winds of spring and the south-western gales of the autumn. We have seen something of the value of shelter in preserving blossom from direct damage, in encouraging conditions favourable to insect pollination and in saving our crops from being blown to the ground, but much remains to be studied in the most effective utilization of wind breaks, and a better selection of aspect. Again, although a beginning of horticultural meteorological observations has been made, we are yet a long way off from understanding those combinations of factors leading to frost damage and the like. However, we are now at least conscious of the dangers of meeting loss through frosts under certain likely conditions.

Finally, now that we have plenty of evidence of the spread of diseases and pests from neglected to well-managed plantations, the attitude of the local authorities towards at least a measure of compulsory pest control should be ascertained. Until the fine lead given by Norfolk in this respect becomes the universally accepted and developed practice, as it is in other fruit-growing countries, the prospects of local initiative deserve close investigation.

2. MATERIAL.

(a) Small Fruit.

Research has proved up to the hilt that success in small fruit-growing depends—after conditions of soil and location—upon two main factors: the selection of the right variety for the place and purpose in view, and the obtaining of a disease-free stock. From the point of view of weight of crop, market suitability and disease control, the commercial varieties of Currant, Gooseberry, Raspberry and other Rubi have assumed distinct personalities, particularly suitable to different types of soil and climate, to early and late markets, for dessert or cooking, for jamming or canning, and for different types of disease control. One careless decision is likely to render a whole acreage uneconomic. Even the insignificant Black Currant requires to be selected for the particular soil conditions, to be planted at an appropriate distance, to be manured more or less generously and to be sprayed with caution according to variety.

Again, with regard to Blackberries, whilst under one set of circumstances Himalaya Giant may thrive and the *Rubus laciniatus* never bear commercial crops, under another the latter may crop heavily and score in enhanced price by its brightness on arrival in the market.

And now we shall have to ask ourselves whether we are planting the Loganberry or its all too frequent impersonator the Phenomenal Berry, and which is superior in cropping and canning quality.

That class of disease inherent in the strain of plant-virus-now conclusively proved to be passed on in the cutting, sucker, or runner (as well as being transmitted by vectors), and which has been the cause of the premature failure and abandonment of thousands of acres of small fruit, has now been shown possible of elimination. The reselection, building up and maintenance of "reversion-free" strains of Black Currant and "mosaic-free" strains of Raspberry are already accomplished facts. The mother nurseries are annually inspected and are in a position to supply. Similar methods are being applied in the case of Strawberry "Yellow-edge," whilst the appearance of "reversion" symptoms in the cane fruits other than the Raspberry is similarly being forestalled by the multiplication of healthy clonal races. The voluntary certification scheme of the Ministry of Agriculture, the establishment of healthy nuclei or mother beds by research institutions, nurseries and growers are making the planting of small fruit to-day a much more certain thing than ever before—and yet the would-be grower often still buys his "cheap" bushes or canesuncertified, unexamined in the scramble to "plant up" something! The time, it would now seem, is ripe for an extension of these measures of certification protecting the grower and guaranteeing him sound material. Then the only valid excuse for failure would be the uncertainty of the markets and the lamentable inadequacy of our horticultural statistics relating to effective cropping acreages and likely potential demand.

(b) Top Fruit.

Although our knowledge of the potentialities of our fruit trees upon different rootstocks is still incomplete and can only become adequate with lapse of time and the extension of properly conducted rootstock trials upon a wider range of potential fruit soils, the advance in our knowledge during the past fifteen years has placed many new facts of economic importance at the disposal of the modern fruit planter.

I recollect sixteen years ago that the planting at East Malling of 'Bramley's Seedling' Apple trees on layered (so-called Paradise) stocks at 30 feet on the quincunx system with an alternate 'Worcester Pearmain' in between at 15 feet was severely criticized by a most representative and knowledgeable committee of up-to-date fruit-growers as a waste of space. Within fifteen years all the 'Worcesters'—just as they were reaching their prime—have had to be removed owing to overcrowding and the remaining 'Bramley's,' even on root-stocks such as Doucin (No. II) and Broadleaf Paradise (No. I), are already overlapping at 20 feet and will shortly be doing likewise at 30 feet.

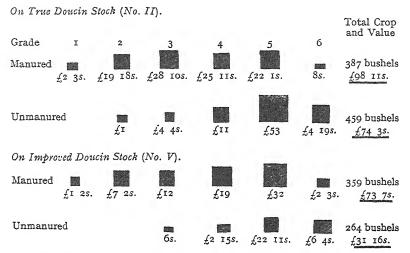
It has now been demonstrated beyond dispute on many acres of Apples throughout Kent, Surrey, Sussex and Essex—to go no further afield—that it is possible through rootstock influence to gauge the potentialities for size, precocity of bearing, cropping, etc., of our trees, and so for the fruit-grower to start with controlled material of which the treatment and response under given sets of conditions are already more or less clearly defined. The same variety, planted upon different rootstocks, requires a different allotment of space and not infrequently different cultural and manurial treatments under similar conditions, and, although they may not always ultimately differ in general vigour, the history of their cropping performance may show startling economic differences as the trees mature. Compare, for instance, the cropping behaviour of trees on the true (No. II) and improved (No. V) Doucin rootstocks at East Malling. A comparison of the fruit quality from trees growing on both root systems is equally startling.

Table I.
Fruit in lb. per Tree.

Variety.	Stock.	At 6 Years.	At II Years.
'Bramley's Seedling'	II	17	375
	V	9	277
'Lane's Prince Albert'	II	23	233
	V	16	183
'Worcester Pearmain'	II	12	165
	V	5	111

TABLE II.

Cropping of 'Bramley's Seedling' in 1929 in Bushels per Acre as graded for Size.



Potential leaf-scorch areas are unexpectedly widespread, and so unfortunately has been that Continental interloper—the Doucin Amelioré—the misnamed Improved Doucin (No. V). The poor performance resulting from this combination of soil conditions and rootstock is enough to ensure economic failure despite ameliorating treatment.

Similar information is rapidly becoming available for Pears, Plums and 'Morello' and other acid Cherries, and, if the modern fruit-planter is not to repeat many of the most glaring mistakes of his predecessors, under present-day pressure of competition he cannot afford to neglect the mass of information now at his disposal. The Brussels stock for Plums under many conditions is as likely to lead to disappointment as the Apple on Improved Doucin, just as the life of the 'Morello' on Mahaleb may now be prophesied usually to be a short and merry one.

It is impossible here to do more than give such examples of the importance of obtaining suitable material, especially as it will be necessary to revert to the question of rootstocks when dealing with modern planning.

As previously suggested in writing of the small fruits, it is equally necessary in the case of the top fruits to select one's varieties in relation to soil and cultural conditions, and the prospective planter has the National Mark lists together with the local knowledge of the County Horticultural Officers as a basis for guidance.

Finally, the Fruit Testing Scheme developing at the Society's Gardens at Wisley should lessen the temptation on the part of the grower to make large-scale plantings of novelties at his own risk.

3. PLANNING AND PLANTING.

I have chosen to place these considerations last, although they can only be discussed in the light of Nos. I and 2, because the factors involved are so numerous and so closely interrelated, and can only be reviewed in the light of the materials—soil and plants—available for the fruit-grower.

(a) General Considerations; Type of Business.

From a previous remark it will have been concluded that modern knowledge does not encourage the interplanting of different kinds of horticultural crops wherever it can possibly be avoided. The reasons for this will become obvious later. Where the build up of the grower is a mixture of market gardening and fruit growing, with the urge to be producing the heaviest possible tonnage off his acreage, and to be as far as possible "on the market" all the year round, the situation of mixed plantings may have to be faced, but some mixtures are much less injurious than others. One has only to study the Plum cum market garden industry of the Vale of Evesham. On the other hand, the ever-growing discrimination of the public demand is logically and, I believe, wisely pressing the fruit-grower into specialization, but if he is afraid to have all his eggs in one basket, we would at least advise him to adopt a system of grading which will separate the brown eggs from the white.

The grower has also to consider whether he is going in for intensive or extensive methods. Probably this recommendation to specialize and the fallacious idea that it is going to be less of a financial strain, has induced many growers in recent years to adopt intensive methods, which may have been demonstrated in isolated instances and in especially skilled hands to have proved successful, but about which, as yet, very little exact knowledge is available, and research has to confess that it has practically no relevant data. The very interesting and suggestive Bulletin 49 of the Ministry of Agriculture on "Intensive Systems of Apple Growing" bears eloquent witness to the paucity of information available from the economic point of view.

It has often been suggested that intensive methods would produce fruit of a quality unobtainable in the ordinary commercial plantation, and that all the now recognized routine operations of spraying, pruning, thinning and picking would be so much more effectually carried out. But such arguments must have been advanced in the days when we were still thinking in terms of standard trees and grass orchards, before bushes of any required size were available on demand and before we fully realized the value and economies of elasticity of practice amongst our trees. The training methods and the close planting of intensive systems make such economies difficult if not impossible.

There is no single road to success. Intensive methods are best adapted to certain psychologies provided they adopt them realizing the limitations as well as the advantages, but in the light of existing available experience and data, the investigator cannot recommend them indiscriminately.

By extensive methods, I do not necessarily mean the supervision of hundreds of acres from the seat of a motor car, though again the grower with a flair for choosing his bailiffs and for giving just the right type of advice can turn the obvious advantages of large scale purchase. production and sale into the most impressive success. However, frankly I think that most of us attempt to spread our capital and energies over too large an acreage and, in travelling around a considerable part of the apple-growing areas of the world it was a very wholesome lesson to discover that the majority of the most successful growers, even in the best-known areas, considered units of 20 and 30 acres ample on which to spread their attentions and from which to expect a reasonable standard of good living and comfort.

By extensive cultivation I merely wish to imply the adoption of planting methods which will allow of the normal horse and mechanical methods of cultivation, etc., and which anticipate the tree's normal development of shape and size according to the ordinary controlling factors.

There is one final general consideration to be emphasized, and that is the economic one. How soon must the would-be grower expect a profit, and for how long does he require his capital to be invested in bearing fruit? If he starts late in life, he probably wants a short and merry fruit-growing career, and the small fruit industry or the very dwarf bush tree will meet his requirements. At the other end of the scale we may want to follow the example of the venerable Kent grower who planted up a fresh area of standard Cherries every time his wife presented him with an addition to the family. Some of us nowadays are so mundane as to take out a new endowment policy! Probably, whilst most of us in these days are anxious for returns as soon as possible, we also want the investment of long duration, and we grasp at the old idea of the permanent and filler crops or treesthe plantation designed to serve two masters! I must discuss the pros and cons of this method more fully later, but I want to emphasize this once and for all, that if there are to be permanent and filler crops, it is generally infinitely wiser they should be of the same kind of fruit (in at least two varieties), making use of rootstock influence and varietal propensities for early cropping, upright and spreading habit, etc., rather than the admixture of different kinds.

I urge this for the following reasons:

(b) Manurial Requirements.

Advances in our knowledge of manuring have definitely proved that different kinds of fruit require different balances of manures. Whilst the Plum and the Black Currant under most conditions flourish under generous nitrogenous manuring, Apples and Gooseberries are soon liable to develop leaf-scorch symptoms, as well as to become prone

to certain fungus diseases, if they do not get the necessary balance of potash, and if the nitrogen dressings cannot be adequately controlled. Investigation has gone further than this. It has shown that different varieties of the same fruit, and even the same variety upon different rootstocks, require special nutritional treatment. It is obvious, too, that, generally speaking, the ration of the large green cooking apple and that of the high-coloured choice quality dessert apple will vary not a little.

Thus whilst it would be possible to think out combinations of different kinds of fruit that could be planted together with little injury from the manurial point of view, it must be emphasized that it is a complex problem to select the two varieties of the same kind of fruit not only from the manurial point of view but for other reasons shortly to be enumerated.

(c) Cultural Treatments.

Cultural treatments are so closely allied with manurial that they can well be considered next. Modern knowledge has taught us to use cultural methods just as we use rootstocks, manuring, pruning, spraying, as one of the cards in our hands for controlling the tree and producing the article we require. Whilst at East Malling we have for years produced heavy crops of large green apples, it was our despair to produce the dessert apple of high quality appearance. Within two years the deliberate grassing down of our bush plantations of 'Worcester Pearmain,' 'Allington Pippin,' and 'Beauty of Bath' has brought us dessert fruit to be proud of. Again I have seen plantations at from six to eight years old so rejoicing in their conditions, so full of exuberant growth, that they became a ready prey to scab or canker. Within one or two seasons the troubles have been cleared up by the omission of cultivations, which no amount of spraying could have effected so cheaply and adequately. Probably in another couple of years these plantations will again be asking for cultivation, which may prove a much cheaper method than trying to get heavy doses of chemical manures through the grass and weeds. To-day we do not think of grass orchards or cultivated plantations when we plan; the plantation must be so designed as to be elastic-to allow us full play for our knowledge of the use of cultivations. If the orchard is interplanted with small fruits such action will be impossible. Again, even amongst the same kind of fruit certain varieties, and even the same variety on certain rootstocks, may not be suited to one and the same cultural treatment.

(d) Disease Control—Spraying and Dusting Requirements.

The admixture of different kinds of fruit adds greatly to the difficulties in the control of diseases. Many small fruits, such as the Red and Black Currants, for instance, are the ready prey of the common Capsid bug (Lygus pabulinus), and when interplanted amongst Apples

the pest spreads from one to the other, and measures of spray control become difficult to operate.

Again, the requirements of the different kinds of top and small fruit in the matter of time, dilution and composition of spray materials are in the majority of cases so different that the whole routine becomes complicated and uneconomic to work. We have learned our lessons at East Malling, where we have had Apples under-planted with Black and Red Currants, and Pears with Gooseberries. We have often had to decide whether we would sacrifice a crucial spraying for apple or pear scab or caterpillar control, or spoil the appearance and possibly even saleability of our small fruits which inevitably get the drift.

These difficulties apply as seriously to intermixtures of different varieties of the same kinds of fruit. We know that under most conditions certain varieties of our commercial Apples, for instance, are sulphur-shy, whilst others suffer badly from copper damage. We can then to-day group our Apples along such lines, and the intermixture of such varieties as 'Lane's Prince Albert,' Stirling Castle,' Newton Wonder' with the general run of varieties which are best lime-sulphured for Scab and Red Spider proves a real embarrassment. It may mean the spraying of alternate trees, or rows, with a different dilution or even mixture. It means going over the ground twice, and in certain very sulphur-shy varieties the foliage drops merely as a result of the spraying of adjacent trees. The use of powder sprays even as an auxiliary in such plantations becomes well-nigh impossible. Even with winter tar distillate washes some varieties of Apple and Plum need weaker applications. Again, certain diseases and pests such as Apple Scab and Sawfly are primarily associated in most seasons with particular varieties. If these can be grouped together with a view to carrying out similar control measures it will be of economic advantage.

(e) Cross Pollination.

Purely from the point of view of the spraying programme it is necessary to interplant varieties which are blossoming contemporaneously. This is also essential from the point of view of cross pollination. We have now for reference plenty of lists recording over a period of years relative times of flowering in different localities, and although these are somewhat affected by the type of pruning and variety of rootstock employed, in general they serve as sufficiently accurate guides.

Further, there are for our reference lists of self-fertile, self-sterile and mutually incompatible varieties. Even more recently, as a result of cytological studies, the curtain has been lifted still further to help us understand why certain intermixtures of varieties are more successful than others, and how it might be ideal to interplant our "triploid" and "diploid" varieties. Possibly further discoveries will be made before long to explain—through the "condition" of the tree itself—

some of the apparent anomalies noted in practice. Although a variety may be self-fertile and may, in years favourable for insect movement, set good crops, it is rarely if ever advisable to plant solid blocks of a single sort, however much from other considerations one may be tempted to do so. In fact, practical observation has shown over and over again that in blossoming seasons when climatic conditions are poor the best sets of fruit are obtained where the greater mixture of varieties is to be found.

It is obvious that until the plant breeder has gone much further and presented us with a whole new range of fruits, constitutionally perfect, we can never reconcile all the considerations already enumerated. We can only avoid the most obvious and glaring imperfections in planting, and if we are conscious from the start that we shall be bound to get up against some difficulties we can often be ready to meet them halfway, without buying afresh an expensive failure.

There is a final caution that must be referred to under this heading. Growers in the past have been only too apt to choose methods of planting which involve the use of "permanent" and "filler" trees, and when the time comes to remove the "fillers" they discover they are taking away the pollinator for the permanent variety, of which they leave solid blocks.

(f) The Actual Plan and Design.

Before discussing this much vexed question of "permanent" and "filler" methods of planting, I think a word must be said about the form of tree.

Apart from the exceptional conditions which have called into being the cordon and other trained trees at the one end and the full orchard standard, under which stock are to be grazed, at the other, there are two general considerations which seem to me more or less definitely to give us a settled principle. We can no longer do with the low bush with its branches starting almost from planting level, or drooping to the ground so as to prevent the effective execution of whatever methods of cultivation the season or the moment may dictate. One year we are practising clean cultivation to encourage growth or conserve moisture, another we are sowing a "cover" crop to add cheap humus, another we may be using a mower to keep down the temporary or permanent grass which we have judged necessary for the condition of the plantation, and we are building up around the tree a moisture-conserving, humus-returning, sod mulch. Again, we want sufficient clear stem to ensure that the unions of scion and stock are planted well above ground level, to allow where necessary for adequate staking and in addition for those many banding expedients which have so frequently to be resorted to and the success of which usually largely depends upon their being kept dry and clean. As a last resort, too, we may sometimes have to use the stem of the tree for such operations as ringing.

On the other hand, in fixing the height of our tree, we have to remember that every few additional inches make it more difficult and expensive to prune and thin and pick fruit, whilst the effectiveness of certain types of spraying—such as capsid control—is definitely reduced. To-day the grower largely forestalls his epidemics by closely watching for their first symptoms, and many of the most up to date are to-day lamenting the necessity of carrying a ladder about with them on their tours of inspection. It is now by no means uncommon even in the most prolific fruit areas of America to hear growers lamenting that they have nothing to correspond to the European range of bush trees. And so what the Continental nurserymen in their catalogues describe to-day as the "English high-bush" has automatically been evolved. And what is its height? Once again I will give no direct answer—though it is probably rarely, if ever, less than 2 feet 6 inches clear stem and rarely more than 4 feet-according to varietal habit, rootstock influence and plantation design. I still have a feeling that even comparatively slight variations in stem height in, say, alternate trees may in combination with varietal habits of growth be manipulated so as to make the most completely effective use of light and space.

This brings me face to face with the question of the "permanent" and "filler" method of planting. Generally speaking, there is more or less of a definite revolt against this plan on the part of those who are advising the practical grower. We are judging from past and experimental plantings. In the past the grower planned his Apple orchards on the old tradition of vigorous Crab and dwarf Paradise stocks, which latter mainly comprised the Doucins and Broadleaf English and Nonsuch Paradise, all of which we now know under normal conditions and with most varieties develop into permanent trees, quite large enough for ease of manipulation and the bearing of large weights of fruit. Consequently, we are looking back over thousands of acres of overcrowded plantations, where the removal of the "filler" has never been faced, and if it were it would probably entail the removal of the pollinator! In the last fifteen years experimental plantings have shown that there are rootstocks much more dwarfing, such as the Jaune de Metz Paradise and the unnamed Malling No. VII, which might have served a filler purpose much more effectively, but up till now we have usually underestimated the space they would healthily occupy, and so the idea of "permanent" and "filler" has become synonymous for "overcrowding." Now that trees of from eight to fourteen years old on Jaune de Metz rootstocks (No. IX) are known to be growing vigorously and fruiting well on a much wider range of soils and under much more diverse treatments than was at one time thought possible, I can see no objection to the continuation of this old idea, under suitable conditions, for those who need early returns. would far rather see the grower make use of rootstock effect in this way than that he should be forced to interplant small fruits as formerly. My chief regret is that up to the present, even when left unpruned and poorly cultivated at East Malling, the trees on Jaune de Metz do not appear likely to die—they may even outstay their welcome—though from inspections of plantations of Apples on this stock growing on the Rhine it would appear that these trees were likely to have reached their best performance at about twenty years. If this is so, I am convinced that trees on more vigorous rootstocks will then still be in their full prime, and there is something to be said for the "permanent" and "filler" system for the man looking for a long-term investment and not wishing to risk putting all his eggs into the Jaune de Metz basket.

I shall be asked whether I recommend solid permanent plants of, say, two varieties on Jaune de Metz, Doucin (No. II) or Broadleaf (No. I), abandoning the "filler" idea altogether. I undoubtedly think such plans equally worth consideration, though up to the end of thirteen years the only accurate data available at East Malling has not given a conclusive answer.

I therefore propose giving you a brief outline of the relevant data which we have to guide would-be planters in the best use of rootstock effect in the planning of their orchards. Once again I propose to take Apples as my illustration, though similar data has now been collected to show that in the case of Plums effective use can be made of the differences in vigour and cropping caused by the use of Myrobalan, Brompton, Common Mussel and Common Plum stocks; and in the case of Pears that the clonal races of free and Quince stock can ensure a similar range of performance.

Once the bad types of rootstock and poor combinations of stock and scion have been eliminated, I am convinced that the planter has a choice of alternatives which will bring him success, provided he makes his selection in the light of all the economic and cultural considerations which have already been enumerated.

Table III shows under East Malling conditions the crop in pounds per tree, over a period of years, of three very different varieties of Apples on four good types of rootstock suitable for different purposes. In every case you will observe the rapidity with which they start cropping on No. IX and the slowness in coming into bearing on No. XII. In 'Bramley's Seedling,' individual trees on No. IX are, tree for tree, still giving significantly the heaviest crops at the end of nine years, in 'Worcester Pearmain' and 'Lane's Prince Albert' they have only retained their pre-eminence to the end of seven years, though in 'Worcester Pearmain' they are then only surpassed by trees on No. I.

Table IV shows, again under East Malling conditions, what these differences in pounds per tree would have meant if the 16 to 20 trees on each stock (from which these data have been collected) had been planted on an acreage basis at suitable distances, up to the end of eleven years. The differences in total weight of crop are very striking and even worth consideration in comparing the performance of the different varieties on Nos. II and I, let alone IX and XII.

Table III. Crop in lb. per Tree.

0					
Stock No.	5-	6 and 7.	8 and 9.	10 and 11.	Total.
' Bramley's Seedling.' XII I I II IX	o 5 6 17	2 15 16 35	48 124 122 118	294 322 230 232	344 466 374 402
'Worcester Pearmain' XII I II IX	2 4 5 6	3 8 7 11	62 69 67 46	85 120 85 95	152 201 164 158
'Lane's Prince Albert' XII I II IX	0 4 6 18	4 20 17 21	19 51 33 33	181 231 177 132	204 306 233 204

TABLE IV.

Variety.	Stock.	Distance in Feet.	No. of Trees per Acre.	11 Years' Total Bushels per Acre.
' Bramley's Seedling '	IX II I XII	12 24 24 36	302 75 75 33	3035 703 876 284
'Lane's Prince Albert'	IX II XII	10 15 18 24	435 193 134 75	2229 1124 1025 382
'Worcester Pearmain'	IX II IX	10 15 15 20	435 193 193 199	1718 796 970 414

Table V shows the same story two years later, and though the crops from trees on the more vigorous rootstocks such as I, XII and XVI are now rapidly increasing, even at thirteen years nothing approaching the weights harvested off trees on No. IX has yet been reached. Since these tables all refer to solid plantings of a single variety on one type of root system, it is thought desirable to show first of all the sort of results which would have been anticipated had interplantings of the same variety on different rootstocks been made. It is not intended to imply that the instances given in Table VI are ideal, or that the recommendation of the planting of blocks of a single

Table V.

Cropping of Different Varieties of Apple over Thirteen Years at
Suitable Distances at East Malling.

Variety.	Stock.	Distance.	No. of Trees.	13 Years' Total Bushels per acre.
'Bramley's Seedling'	IX I II XVI XII	at 12' ,, 24' ,, 24' ,, 36' ,, 36'	302 75 75 33 33	4522 1412 1076 544 515
'Lane's Prince Albert'	IX I II XVI XII	at 10' ,, 15' ,, 15' ,, 24'	435 134 193 75 75	3589 1970 1925 1052 611
'Worcester Pearmain'	IX I II XVI XII	at 10' ., 15' ., 15' ., 20' ., 20'	435 193 193 109	3023 1602 1201 725 643
'Cox's Orange Pippin'*	IX I II XVI	at 10' ,, 14' ,, 16' ,, 20'	435 222 170 109	653 * 277 212 41

^{*} At eleven years.

TABLE VI.

Suggested Methods of Interplanting and Estimated Yields Resulting therefrom—Based on Thirteen-Year Yields.

Variety.	Stock.	Distance.	No. of Trees.	Bushels per acre.
' Bramley's Seedling '	XII IX IX IX	36 18 36 12 12	33 101 33 269 302	515 1512}2027 621 4028}4649 4522
' Worcester Pearmain'	XII } XII } IX	30 15 30 15 30 10	48 145 48 145 48 387 435	283 1486 283 1291 1008 1291 398 3088 2690 3023
'Lane's Prince Albert'	XII XII XII IX IX IX	30 15 30 15 30 10	48 145 48 145 48 387 435	391 2131 2522 391 1196 1587 706 3192 3898 3192 3589

variety is implied, but they illustrate quite clearly what very different weights of fruit can be realized by a judicious intermingling of rootstocks.

Whilst an acre of 'Bramley's Seedling' on No. I, a permanent plant at 24 feet square (75 trees to the acre), was yielding 1,412 bushels, a permanent and filler plant with the trees on No. I at 36 feet (33 trees to the acre) and those on No. IX at 12 feet in between (269 trees to the acre) yielded 4,649 bushels over the same period of time. The considerable difference in cost of initial capital outlay, of increased cost of annual routine operations and of the ultimate yield of the 33 as against the 75 permanent trees has of course all to be set against the immediate apparently increased returns, from the early years at least up to thirteen, on the plantation designed upon permanent and filler lines. Frankly I do not know the answer as to which will ultimately prove most profitable, but it is one of the ambitions of East Malling during the next few years, if the support is forthcoming, to plant up a series of trial acres on the lines of these plans and to keep full costings and returns during the life of these plantations. It is the only way to obtain accurate data and to round off the rootstock investigations started twenty-one years ago.

Although I trust I have already made it abundantly clear, from a detailed rehearsal of all the considerations involved, that I believe it impossible to suggest any one plan of planting as universally applicable or ideal, I am finally venturing to show you two plans, one for a permanent plant and another for a permanent and filler plant, which, whilst elastic in every detail, may offer a kind of skeleton upon which to hang all the pros and cons. I have chosen an admixture of two of the varieties of which I have exact data, and which, from the point of view of varietal growth habit and pollination and spraying requirements, intermix well. I am not suggesting that 'Bramley's Seedling' and 'Worcester Pearmain' are an ideal combination from all points of view, though in most places they probably rank as the two safest commercial varieties to grow.

Table VII shows them in alternate rows on either No. I or II rootstocks, on a 24-foot square plant which would ultimately allow fo "diagonal" thinning if the trees grew beyond expectation. Whilst there are many advantages in these alternate rows, other variations of this type of plant have been suggested in Bagenal's recent article on "The Planting of Apples," in the Norfolk Fruit Grower, being the Year Book of the East Norfolk Fruit Growers' Association for 1933.

Table VIII contemplates an ultimate plant of 'Bramley's Seedling' at 48 feet square with a permanent centre pollinator, 'Worcester Pearmain,' at approximately 42 feet from the 'Bramley's' on the diagonal. I have chosen to plant filler trees on No. IX, with nearly four times as many 'Bramley's' as 'Worcester's' as a result of our East Malling experience. The fillers might equally have been on No. I at 24 feet and in different proportions, especially for soils and types of cultivation unsuited to No. IX and not so favourable to

TABLE VII. Plantation of 'Bramley's Seedling' in Alternate Rows on Nos. I or II at 24 feet square.

-			-				-
į	В	В	B	В	В	B.	
	W	W	W	w	w	W	
	В	В	В	В	В	B	
1	W	W	w	w	w	W	
:	В	В	В	В	В	В	1

B = 'Bramley's Seedling' (38 trees to the acre).
 W = 'Worcester Pearmain' (38 trees to the acre).

TABLE VIII.

Plantation of 'Bramley's Seedling' and 'Worcester Pearmain' on No. XVI at 48 feet, interplanted with the same Varieties on No. IX at 12 feet.

-												_
	В	В	В	В	В	В	В	В	B	B	В	1
	B	W-	В	В	В	w	В	В	B	w	В	1
ì	В	W.	В	W	В	w	B	w	В	w	В	
	В	W	В	В	B	w	В	B	В	w	В	1
7	В	В	В	B	B	В	В	В	B	В	B	
	В	1//.	В	В	В	w	В	В	В	w	В	
1	В	w	В	W	В	w	B	W	В	w	В	,
71	В	w	В	В	В	w	В	В	В	w	В	

B = 'Bramley's Seedling 'on XVI (19 trees to the acre).
W = 'Worcester Pearmain' on XVI (19 trees to the acre).
B = 'Bramley's Seedling' on IX (208 trees to the acre).
W = 'Worcester Pearmain' on IX (56 trees to the acre).

'Bramley's Seedling.' On the basis of our available data, we have drawn up Table IX, showing the differences in the expected yields up to the end of thirteen years on the basis of these alternative plans. They are merely intended to drive home the immense importance of considering the rootstock aspect of the planting problem in conjunction with all the other economic and cultural factors. Possibly the amount of space available to plant will help you to decide on the size of tree and variety of rootstock; or vice versa, the type of tree you want to grow and routine you visualize, will determine the variety of rootstock and the amount of ground that you will require to plant up.

TABLE IX. Suggested Methods of Interplanting two Varieties in Alternate Rows on Various Rootstocks.

Stock.	Distance.	No. of Trees.	Total Yield in Bushels per Acre over 13-Year Period.
I	24 ft.	Br 38 W 38	7 ¹⁵ } 1030
II	24 ft.	Br 38 W 38	545 } 782 237 }
IX	12 ft.	Br 151 W 151	2261) 1049 3310
XVI *and IX	48 ft. 12 ft.	Br 19 W 19 Br 208 W 56	313 126 3115 389

^{*} See plan of arrangement of trees, Table VIII.

When planting up fruit, we have to recognize that we shall be handling a highly perishable product unfortunately very subject to climatic conditions and the vagaries of the market, but apart from these factors which have not yet been sufficiently recognized as business for scientific investigation, I claim that modern research has transformed fruit-growing from an empirical speculation into something approaching sound business in which the expenditure and returns over a period of years can now be forecast with considerable exactitude, provided the modern commercial planter will only lay firm foundations based on a consistently reasoned policy cemented by an adequate supply of capital to allow him to develop his plan to the full.



Fig. 20.—A Medieval Herb Garden.
(From Petrus Crescentius "Opus Ruralium Commodorum.")

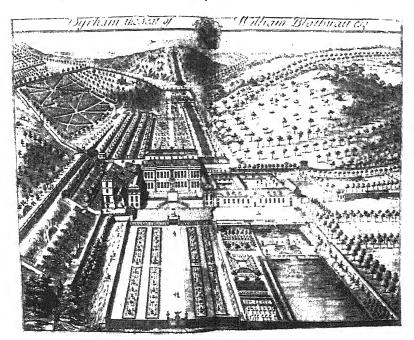


Fig. 21.—Pictorial Plan of a Large 18th-century Garden.



Fig. 22.—Scene in a Medieval Orchard. (From Petrus Crescentius ''Opus Ruralium Commodorum.'')

ENGLISH GARDENS IN MEDIEVAL, TUDOR AND STUART TIMES.

By Eleanour Sinclair Rohde.

[Read December 13, 1932; Mr. E. A. BUNYARD, F.L.S., in the Chair.]

ALTHOUGH during the decline of the Roman Empire, and still more after its dissolution, the art of gardening sank to a low ebb in Western Europe, medieval gardens preserved in their architecture and symbolism much that is significant of their ancient Eastern origin. The preservation of the old traditions was doubtless largely due to the inmates of monasteries, who almost alone enjoyed sufficient security to practise the art. But it is important to remember that the revival of the art of gardening in Western Europe coincided with the Crusades, a period when men and women of every rank were brought into close contact with the East, and consciously or unconsciously imbibed Eastern traditions of garden architecture.

The fact that the civilizations of Egypt and Babylon depended entirely on irrigation is of dominating importance in the history of gardening. All illustrations of medieval, Tudor and Stuart gardens, and the horticultural literature of these periods point to the influence of a garden craft based on the necessity of continual irrigation. The most definite, the simplest and probably the earliest of all garden plans —a garden divided in four by four rivers issuing from a central source is depicted in the Hindu Vedas, Persian garden carpets, and illustrations of gardens in the Emperor Babu's Memoirs. These are but a few examples of a traditional plan dating back probably to a remote past. In illustrations of medieval, Tudor and Stuart gardens we find the survival of this ancient fourfold field plot. The chess-board arrangement of beds in the old formal gardens is a still more striking example of the force of tradition (fig. 20). In the East this was necessary to facilitate irrigation during the dry season, and in the West we maintained this traditional lay-out of rectangular formal beds till nearly the close of the eighteenth century.

Most curious of all, perhaps, is the fact that the tradition of a mount was so faithfully preserved. The origin of the hanging or terraced garden is doubtless due to the ancient veneration for high places. Even in Tudor times mounts were frequently the most important features of gardens. Bacon, in his essay "Of Gardens," decrees the making of a mount "in the very middle of the garden." The garden or banqueting houses which crowned these edifices are suggestive of the temples that crowned the ziggurats of ancient Babylon. Possibly, in these islands mounts in gardens preserved the memory not only of the ancient Eastern mounts, but also the "holy hills" of our early British ancestors. The artificial mounts made by the ancient Britons are still amongst the most famous in the world, notably Glastonbury Tor and the Round Table Mound at Windsor. Further, like the ziggurats, the ancient British mounts were terraced.

The only ancient feature of gardens that has survived to modern days is the maze. These curious works, representative of those described by Pliny as "the most stupendous on which mankind has expended its labours," were important features of gardens throughout medieval, Tudor and Stuart times (fig. 23).

Further, we maintained for centuries the Eastern tradition of a "garden enclosed." Our very word "garden," in all its formsgarth, vard—is derived from an Aryan root signifying enclosure. Indeed, the pleasaunces of the wealthy, particularly in medieval and early Tudor times, were so protected that they were symbolic of the town rather than of the country-side. Nowadays, we endeavour to maintain in our gardens the peace and quiet that modern conditions have destroyed in most country parts. But in those far-off times peace and security, at least to a comparative degree, were possible only in enclosed and well-guarded towns. The medieval garden reflected in no small measure the security of a walled town. Within the enclosure, the clipped walls of verdure, the alleys and fountains, the flowers surrounded with trellis-work or rails, were all suggestive of a medieval town, with its narrow streets, high walls, fountains and carefully guarded treasures.

Of gardens in very early times in these islands we have no definite information, but there is the charming legend of Saint Maurilius, who worked as a gardener for a British prince four hundred years before Charlemagne's reign. This legend is depicted in one of the celebrated Angers tapestries. And it is pleasant to remember in connexion with the earliest plan of a garden that has been preserved—that of St. Gall, near the Lake of Constance—that this monastery was founded by St. Gall, an Irishman who in 585 followed St. Columban on his mission to the Franks. Later he founded the monastery which he ruled for ten years. For a hundred years after his death the rule of St. Columban was followed.

The earliest plans of a monastic garden in these islands are those of Canterbury, made about 1165. These plans, bound up with the Great Psalter of Eadwin, are now in the library of Trinity College, Cambridge. In one of these plans nearly half the space between the dormitory and the infirmarium is occupied by the herbarium, a garden which must have been a source of continual pleasure to the sick folk, and the other plan shows the orchard and vineyard beyond the walls. The plan is not large enough to show the garden attached to the Archbishop's Palace, where the knights who murdered Becket threw their cloaks and gowns under a sycamore and donned their armour.

Most monasteries seem to have had numerous gardens, and the post of gardenarius can have been no light one, for he had the charge of the herb garden, orchard, vineyard, the sacristan's garden, where the flowers for the adornment of the church were grown, and the abbot's or prior's privy garden, in addition to private gardens belonging to other office-holders.

Emphasis is always laid on the debt we owe the monasteries for preserving the art of gardening, but I think it is even more interesting to realize that the introduction of many plants was probably owing to monastic orders. The Hospitaller Orders—the Templars and the Knights of Saint John—had unique opportunities to introduce many treasures from the East, opportunities they are not likely to have neglected, particularly as they owned numerous gardens in various parts of England. To quote but two instances—Hampton Court Gardens are on the site of a house and garden which belonged to the Hospitallers, and the Temple Garden recalls the memory of the Knights Templars.

Of Royal gardens the earliest of which any information has come down to us is that made by Henry I at Woodstock, where he had a park fourteen miles in circumference. There he had a collection of wild animals sent him from "divers outlandish parts." Woodstock is chiefly famed for the maze made in Henry II's time, associated with the tragedy of Fair Rosamond. Contrary to popular belief, this was not a hedge maze but an architectural labyrinth. This is clear from the reference to the place written by John Brompton, the Chronicler in 1151, and there is considerable further evidence. The first mention of a garden at Woodstock as distinct from the park is in Henry III's reign. We have no definite information concerning any of the Royal gardens, but they were doubtless similar to the type of royal gardens described by Petrus Crescentius in his Opus Ruralium Commodorum (latter half of the thirteenth century) (figs. 20, 22). The earliest English illustration of a Royal garden that has been preserved is a miniature in a copy of Marco Polo's travels (now in the Bodleian Library) written and illuminated in the fifteenth century. In this miniature a King and Oueen are depicted sitting in a garden and playing chess. The gardener, who appears to be pruning a tree, watches them over a castellated wall. The earliest description of a Royal garden—that of Windsor Castle—is to be found in James I's well-known poem "The King's Quair." The shady alleys, arbour, and thick hawthorn hedges he mentions indicate that the garden was by no means new.

London was noted for its gardens as early as the twelfth century. FitzStephen, in his life of Becket, refers to the citizens' large and pleasant gardens. The most noted London garden of medieval days was that belonging to the Earl of Lincoln in Holborn. This garden belonged originally to the Dominicans and there were also a vineyard and fish ponds. In the fourteenth century, and probably long before, there was a market opposite the church of Saint Austin where gardeners sold their surplus produce.

In later medieval times gardens increased in size. With increasing security it was no longer necessary to make them within the confines of the castle. As in the ancient East, the chief gardens were the

orchard, the herb garden, and the vineyard. The orchard, as in the East, was a pleasure garden laid out on formal lines, and usually adorned with a fountain. The grass, in imitation of the natural meadow, was starred with flowers. Chaucer's description of a flowery mead of this type is too well known to quote. Even small plots of grass were planted with flowers. There are numerous illustrations in medieval manuscripts of this custom, the best known being perhaps the miniature in the fifteenth century copy of the Romance of the Rose in the British Museum. Turfed seats of the type described by Chaucer, arbours, vine-clad galleries (which we call pergolas), raised beds, topiary work, were other characteristic features. A charming description of a garden, partly medieval and partly Tudor in character, is to be found in Stephen Hawes' Historie of graunde Amoure and la bell Pucel. When the gate of "the garden fayre by musickes tower, walled most goodly" was opened, Amour and Good Counsell beheld the four-square inner enclosure "to Paradise right comparable," the knot gardens laid out in lions rampant and dragons, the dulcet spring, the gold and blue fountain made in the similitude of a three-headed dragon spouting water into a silver pool, and beside the pool sat la bell Pucel making a chaplet of flowers.

Tudor gardens varied from splendid pleasaunces, such as those of Hampton Court, Kenilworth, Theobald's, Nonsuch, Sion House, and Sir Thomas More's at Chelsea, to humble farmhouse gardens of the type depicted in Tusser's Five Hundred Points. Of Hampton Court Garden much has been written. The best description of Kenilworth in Elizabethan times is that to be found in Robert Laneham's letter, dated 1575, written to Master Humphrey Martin, mercer of London, on the occasion of Queen Elizabeth's visit. Few contemporary writings give so vivid a picture of a private garden—a vast enclosure divided into four plots, the spacious grassy terrace overlooking it, the well-filled flower plots, the carved beasts, the aviary, the magnificent fountain, the arbours and the crowds of folk gathered for the pageant. Little is known of Theobald's, the garden that is supposed to have inspired Bacon's essay "Of Gardens." Gerard had the charge both of this garden and Lord Burleigh's in the Strand for twenty years. Hentzner, who visited it in 1591, gives a very uninteresting description of it, yet when James I visited Theobald's on his "Southern Progress" he desired it so much that a few years later he gave Burleigh Hatfield in exchange for it. Sion Garden dates back to the reign of Henry V, when the religious houses there (one for monks and one for nuns) were founded by the King on his accession. The gardens in Edward VI's reign were laid out by the Lord Protector Somerset, and it is more than probable that William Turner, the Father of English Botany, supervised the work. Turner was chaplain and physician to Somerset, who was keenly interested in botany. Turner's Names of Herbes is dated from Sion House, there are frequent references in his writings to the garden and the first part of his Herbal he dedicated to Somerset. It is possible that the oldest cypresses at



A D here I allo place the other Paze, whiche may be lyke exozed and vied, as I spake before, and it may cyther be set with Rope and Tyme, or with winter Sauery and tyme. For these do well endure, all the winter through grene. And there be some, which set their Pazes with Lauender Cotton, Spike, Paierome, and such lyke.

But

Fig. 23.—Plan of a Dwarf Shrub Maze. (From "A most Briefe and Pleasaunt Treatise," 1563.)



Fig. 24.—A Medieval Fountain.



Fig. 25.—Garden Scene from an Elizabethan Hanging.



Fig. 26.—Pleached Alley of the Eighteenth Century. (From "Catalogus Plantarum.")

Sion are those mentioned by Turner in his Herbal. The only contemporary account of Sir Thomas More's garden is that by John Heywood, the early English playwright, who described it as "wonderfully charming, both from the advantages of its site . . . and also for its own beauty; it was crowned with almost perpetual verdure; it had flowering shrubs, and the branches of fruit trees interwoven in so beautiful a manner that it appeared like a tapestry woven by Nature herself." Part of this famous garden is now Elm Park Estate.

The most important plan of an Elizabethan garden that has been preserved is that of All Souls College, Oxford. This garden was made by Robert Hovenden, Warden at the time of Queen Elizabeth's second visit to Oxford, at his own expense. The plan is in the first of the five volumes of Typus Collegiae. The plan shows that knot gardens were the dominating feature, one of the knots being laid out in the design of the college chevron between three cinquefoils gules. terrace with a summer-house is indicated, and the hedges between the cloister and knot garden are shown cut to resemble castellated walls.

The characteristic features of Tudor gardens were fountains (usually very ornate), carved heraldic animals, "curiously knotted gardens," railed beds, well-kept walks, garden houses varying from simple arbours to sumptuous buildings, mounts, topiary work and mazes. Fountains were so magnificent as to suggest Italian influ-Bacon approved of them, but pools he condemned, though he admitted that bathing pools "may admit much curiosity and beauty wherewith we will not trouble ourselves; as that the bottom be finely paved, and with images; the sides likewise and withal embellished with coloured glass and such things of lustre encompassed also with fine rails of low statues." Carved heraldic animals were numerous in the Royal gardens. The only contemporary illustration of them is in Holbein's "Henry VIII and his family" (Hampton Court). On either side of the royal group are depicted Simon the Jester and his wife Jane the Fool, and in the background of both these portraits these carved beasts are shown, sitting on carved pillars and holding aloft vanes. The garden shown is that of Whitehall. When Leopold von Wedel visited Whitehall in Queen Elizabeth's reign, he was chiefly impressed with the great sundial and the carved beasts.

Numerous plans for knot gardens are to be found in sixteenth and seventeenth century gardening books. The designs were laid out in lavender cotton, thyme, or even taller growing plants, such as hyssop, and the interstices planted with various flowers, such as daffodils and hyacinths. We have only recently begun to imitate the Tudor custom of planting flowers in mixed colours "so that the place may seem like a piece of tapestry of many glorious colours to encrease every one's delight." The interstices were sometimes covered with different coloured sands instead of plants. Bacon condemned this custom. "As for the making of knots or figures with divers coloured earths . . . they be but toys; you may see as good sights many times in tarts." The knot gardens were not only designed to set forth the spring flowers

but to afford pleasure in winter. Late autumn and mid-winter flowers were so few that these evergreens in the knot garden and mazes made the beauty of the garden during the bleakest months. It is interesting to recall that a knot garden won the gold medal of the last International Flower Show held in New York. The skilful arrangement of the dwarf evergreen shrubs was remarkable. The railed beds of Tudor times supplanted the elaborate trellis-work of earlier days. Beds not "enknotted" were called "open knots," and these were supported with oak boards, lead, shank bones of sheep or tiles. The beds were not raised so high as in medieval times. Parkinson writes of oaken inch "boords . . . foure or five inches broad" being used as supports, which indicates the usual height. He describes the use of "whitish or blewish pebble stones" for edgings as "the latest invention."

Walks were of great importance. To quote Parkinson "The fairer and larger your allies and walks be the more grace your garden shall have." The open walks were turfed or sanded, and Bacon commended walks planted with burnet, wild thyme and water mint-" Therefore you are to set whole alleys of them to have the pleasure when you walk or tread." Alleys with trees arching overhead were not only for shade in summer but also for protection from wind and rain. "The thick pleached alley" wherein Don Pedro and Claudio walked (Much Ado about Nothing) was probably an alley of this kind, or it may have been the type described by Bacon—" a covert alley upon carpenter's work, about twelve foot in height, by which you may go in shade into the garden." There were also "privy ways" between hedges, and Parkinson states that white-thorn, privet, and sweetbriar "enlaced together" were used to make them "and roses of one or two or more sorts placed here and there amongst them." Pyracantha was highly valued for its berries "which make a glorious show among the green leaves in winter time." Shady alleys made along enclosing walls were called wall herbers, and Thomas Hyll suggests using fragrant plants such as rosemary, jasmine, and musk roses. He also suggests the making of apertures in wall herbers of any length, in order that the owner and his friends might "the more fully view and have delight of the whole beautie of the garden." Substantial galleries were made only in large gardens.

Many sixteenth and seventeenth century garden books contain designs for mazes. With few exceptions the designs are for dwarf mazes. These must have been charming features and in perfect keeping with a formal garden. Topiary work was apparently commonly practised even in small gardens. "Your Gardener," says William Lawson in The New Orchard and Garden, "can frame your lesser wood to the shape of men armed in the field ready to give battle: of swift-running Grey-hounds or of well scented and true running Hounds to chase the Deer or hunt the Hare. This kind of hunting shall not waste your Corn nor much your Coyne." Bacon condemned the art: "I for my part do not like images cut out in juniper or other garden stuff—they be for children." He was equally unappreciative of vases

and statues, which he said added nothing to "the true pleasures of a garden."

Garden houses were evidently a fashionable craze, and Hall, the Tudor chronicler, condemns severely "these summer houses like Midsummer Pageants with Towers, Turrets, and Chimney tops . . . not so much for use or profit as for show and pleasure and bewraying the vanity of men's minds, much unlike to the disposition of the ancient Citizens who delighted in building of Hospitals and Almshouses for the poore." In humble gardens arbours were commonly made—"pleached bowers where honeysuckles ripened by the sun forbid the sun to enter." Arbours were also made in lime trees. Parkinson describes a three-storied arbour he has seen "at Cobham in Kent" made by pleaching the boughs of a lime tree. He states that there was room for at least fifty men in each of the first two stories "which was the goodliest spectacle mine eyes ever beheld for one tree to carry."

The first complete catalogue of a garden was that of Gerard's garden, published in 1596. The only known copy of the first edition is in the Sloane collection in the British Museum. The second edition, published 1579, is excessively rare. Gerard gives much information about this garden in his Herbal, and it was evidently full of rarities. It is at least probable that Shakespeare visited this garden, which was on the slope of the hill between Ely Place and the Fleet. For Shakespeare lived in the house of a Huguenot refugee, Mountjoy by name, 1598–1604, and was therefore a near neighbour of Gerard. Mountjoy's house was at the corner of Mugwell Street (now Monkswell Street) and Silver Street, and almost opposite the Barber Surgeons' Hall. In 1598 and again in 1607, Gerard was examiner of candidates for admission to the freedom of the company. That Shakespeare, whose own works contain so much herb lore, should have failed to visit the garden of the greatest herbalist of the day seems most improbable.

The humble but delightful farm-house garden of the period is immortalized in Tusser's homely volume—Five Hundred Points (1573). Herein we find that the farm-house garden was then very much what it is now—a garden abundantly stocked with fruit and full of the "old-fashioned" flowers that have been favourites with every class in this country from time immemorial—red roses, damask roses, Madonna lilies, daffodils, columbines, wallflowers, pæonies, sweet Williams, carnations and pinks, snapdragons, hollyhocks, pansies, lily of the valley, marigolds, lavender, valerian, honeysuckle, bachelors' buttons, rosemary, primroses, poppies, etc. The garden was the special province of the housewife and, seedsmen being scarce in those days, it was her duty to collect her own seed and exchange with neighbours.

Good huswifes in Sommer will save their owne seedes against the next yere, as occasion nedes.

One seede for another, to make an exchange with fellowlie neighbourhood seemeth not strange.

Many of what are now our most familiar plants were introduced during the latter half of the sixteenth and first half of the seventeenth centuries. To mention but a very few: tulips, crown imperial, Nigella, the yellow crocus, Persian Ranunculus, "African" marigolds, Sweet Sultan, annual and perennial sunflowers, honesty, the annual candytuft, Marvel of Peru, Michaelmas daisies, everlastings, etc., and amongst shrubs and trees, Acacia, the American plane, red maple, tulip tree, and amongst vegetables, the potato, Jerusalem artichokes, skirrets, and Scorzonera. Further we owed much to the Huguenot refugees. They founded the first flower societies in England and the market gardens they established, notably at Battersea and Bermondsey, became famous.

Apparently the earliest efforts to protect delicate plants during the winter and to force for early blooms were made during this period. Judging from his writings, Sir Hugh Plat, the owner of several wellknown gardens in Elizabeth's reign, was deeply interested in these efforts, but the first detailed account is to be found in Gervase Markham's English Husbandman (1613). "I have seen divers Noblemen and Gentlemen, which have been very curious in these dainty flowers (daffodils and columbines, hyacinths, narcissi and tulips) which have made large frames of wood (with boards of twenty inches deepe) standing upon little round wheeles of wood, which being made square or round according to the Master's fancie, they have filled with choyse earth, such as is most proper to the flower they would have grow, and then in them sowe their seedes, or fixe their Plants, and so placing them in such open places of the Garden, where they may have the strength and violence of the Sunne's heate all the day, and the comfort of such moderate showers as fall with-out violence or extraordinaire beating, and at night draw them by man's strength into some low vaulted gallery iovning upon the Garden, where they may stand warme and safe from stormes, windes, frosts, dewes, blastings, and other mischiefes which ever happen in the Sunne's absence and in this manner you may not onely have all manner of dainty outlandish flowers, but also all sorts of the most delicate fruits that may be, . . . And least any man may imagine this is but an imaginery supposition, I can assure him that within seaven miles of London, the experiment is to be seene where all these fruits and flowers with a world of others grow in two Gardens most abundantly." Parkinson describes a similar method of growing oranges.

Vineyards declined in the seventeenth century. In Elizabethan times they had been apparently as important as in medieval days. Shakespeare's brief phrase "thy pole-clipt Vineyard" shows that, as in ancient Egypt, vines were commonly grown trained up poles. There are many references to vineyards in Sir Hugh Plat's writings and he asserts that English wines should be as good as those made on the Continent. Where vineyards were a failure he ascribes the cause to the "blockish ignorance of our people who do most unjustly lay their wrongful accusations on the soil." Parkinson, who lists twenty-three varieties of grapes, ascribes the decline in vineyards to the change in our climate (this sounds modern!) and to the Dissolution of the

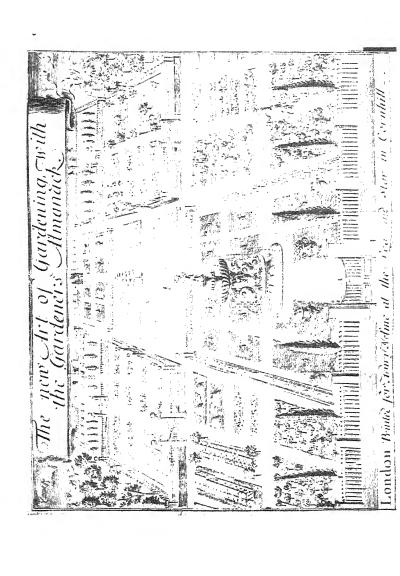


Fig. 27.—A small garden of Queen Anne's reign.

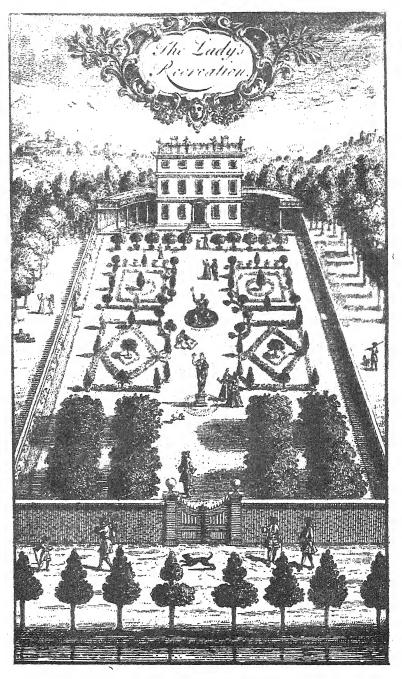


Fig. 28.—Plan of a garden. (From "The Lady's Recreation" by Charles Evelyn, 1717.)

Monasteries. For the monks were the skilful growers " and the knowledge how to order a Vineyard is also utterly perished with them. . . . I think it a fruitlesse labour for any man to strive in these daies to make a good Vineyard in England in regard not only of the want of knowledge . . . but most chiefly and above all others that our years in these times do not fall out to be so kindly and hot to ripen the grapes. to make anie good wine as formerly they have done."

During the latter half of the seventeenth century efforts were made to revive viticulture. Two books on the subject were published, the one by William Hughes (The Complete Vineyard 1665), and the other by John Rose (The English Vineyard Vindicated 1666). John Rose was head of the Royal gardens. Sir William Temple introduced four new grapes, and he describes the Burgundy as "the surest to ripen in our climate."

Gardens naturally suffered and declined during the troublous years of the Civil Wars and the Commonwealth, but the Restoration witnessed a great revival of interest in the art. From this time onwards French influence became paramount until the accession of William III. Charles II, who during his exile had been impressed with the new and splendid type of French garden, was largely responsible for the change effected in English gardens. By his orders French gardeners were brought over to alter St. James's Park, and the place became the fashionable resort of the day. Wealthy folk hastened to follow the royal example and gardens in "the grand manner" became fashionable. Whether Le Nôtre himself ever came to this country is more than doubtful, but his influence, as in every other country in Western Europe, was paramount in garden architecture. Until his day, gardens were Gothic in character, and in their stead he created stately pleasaunces in perfect keeping with the palaces designed by the greatest architects of the century. His "peculiar magic of infinite perspectives" was wholly unsuitable however, save for gardens of the largest size, and gardens of moderate dimensions in these islands did not suffer from his influence. The best description of a seventeenthcentury garden of the old type is that of Moor Park, in Sir William Temple's Garden of Epicurus. This garden, which he describes as "the perfectest figure of a garden he ever saw," must have been singularly charming. The "great parlours" of the house opened on to the broad terrace, three flights of steps led down to the parterre garden, adorned with a fountain, statues and summer-houses, and surrounded with stone paved cloistered walks, one of them shadowed with vines. The lower terrace was planted with fruit trees "ranged about the several quarters of a wilderness which is very shady; the walks here are all green." It is easy to believe Sir William Temple's statement that the garden was "the sweetest place I think that I have seen in my life either before or since at home or abroad . . . the remembrance of what it was is too pleasant ever to forget." For it was evidently a homely old-fashioned English garden and not an imitation of French grandeur.

As gardens became larger lawns increased in size. In the seventeenth century they were commonly surrounded with wooden rails, and John Rea, in his Flora, Ceres and Pomona, gives detailed instructions for the making and painting of these "sawed Rails five inches broad and an inch and a quarter thick." Camomile lawns were so commonly made that directions for their upkeep are to be found in most manuals of the period. It is interesting to note in passing that camomile lawns were still features of English gardens even in the early nineteenth century. Charles Marshall, in his Introduction to the Knowledge and Practice of Gardening (1805), gives full instructions for making "green and carpet walks" of camomile. Buckingham Palace Garden is one of the few gardens where large stretches of lawn are to this day planted with camomile.

Bowling greens were important features of gardens in the late seventeenth century. One of the earliest in this country was that made at Windsor Castle by Charles II's orders. Bowling greens were commonly surrounded with trees. To quote the author of The Solitary Gardener, "A Bowling Green should be incompassed with great Trees such as Elms, Horse-chestnut trees or Acacias accompanied with Yews. They are only proper in spatious Gardens and commonly are drawn in the remotest places to prevent the confining of the prospect by the tall Trees that surround it."

From Restoration times onwards conservatories were more commonly built, and orangeries were conspicuous features in large gardens. Gibson, in his Short Account of several Gardens near London, states that at Beddington there was the finest orangery in England. Contrary to the usual method the trees were growing in the ground "and have done so near one hundred years, as the gardener, an aged man said he believed . . . he said he gathered off them at least ten thousand oranges this last year."

Garden houses in the seventeenth century were frequently called "shadow houses." For instance, in the Parliamentary Survey of the manor of Wimbledon, formerly the property of Queen Henrietta Maria, five "shadow houses" are mentioned. In private gardens it was customary to build them near the road, for they were commonly used as waiting-rooms for the coach. John Worledge, the author of Systema Horticulturae, was evidently of the opinion that their chief use was as a retreat from one's family and friends! "The more remote it is from your house, the more private you will be from the frequent disturbances of your Family or Acquaintance." He suggests further the use of screens of "printed and painted Sarcenet" and "shutters of thin Wainscot in the Night" to prevent "others from disturbing your Solitary repose."

Sundials, as in Tudor times, were favourite garden ornaments, and during the latter years of the seventeenth century living sundials were a favourite conceit. The figures were laid out in box or some other suitable shrub. Detailed instructions for the making of these sundials are to be found in William Hughes' Flower Garden. He states that

in the West Indies they were planted in myrtle or cypress. The only contemporary illustrations of these sundials are to be found in Loggan's Oxonia Illustrata, Williamson's Oxonia depicta, and Loggan's Cantabrigia Illustrata. Andrew Marvell wrote charmingly of these living sundials, and it was evidently the custom to lay them out in fragrant herbs:

> How well the skilful gardener drew Of flow'rs and herbs this dial new; Where, from above, the milder sun Does through a fragrant zodiack run, And, as it works, the industrious bee Computes its time as well as we! How could such sweet and wholesome hours Be reckoned but with herbs and flow'rs.

Southey, in his Letters of Espriella, comments on the destruction of the living sundial at New College and adds: "These have been destroyed more easily as well as more rapidly than they were formed but as nothing more beautiful has been substituted in their place it had been better if they had suffered these old oddities to have remained."

The most remarkable English garden during the latter half of the seventeenth century was that of Wilton: a garden associated with great names of Tudor and Stuart times-Queen Elizabeth, Sir Philip Sidney, who wrote his Arcadia here, Edmund Spenser, Ben Jonson, Christopher Marlowe, Beaumont and Fletcher, Izaak Walton and George Herbert. There has always been the tradition that Shakespeare acted here in As You Like It, on the occasion of James I's visit in 1603. The tradition is probably true, for William Herbert, first Earl of Pembroke, and Shakespeare were friends, and to "the most noble and incomparable pair of brethren," William, Earl of Pembroke, and Philip, Earl of Montgomery, the early folios were dedicated. Philip, who succeeded his brother as Earl of Pembroke, was a close friend of Charles I, and it was at the King's suggestion that the Earl decided to replace the house, said to have been designed by Holbein, by a statelier mansion, and invited Isaac de Caux to design the garden. The plan of the garden in de Caux' book shows in detail what a magnificent garden of that period was like. The large space near the house was laid out in elaborate knot gardens, it was adorned with four fountains and bounded by a terrace. Beyond was the "wilderness," with the river Nadder flowing through woods and groves and on either side two long tunnelled arbours. Beyond were magnificent fountains and then the vast lawn planted with cherry trees, the centre of the lawn being adorned with a brass Gladiator, "the most famous statue of all that Antiquity hath left." At the farthest end the garden was bounded by a huge stone portico and on either side stairways, having instead of balusters "Sea Monsters casting water from one to the other from the top to the bottome." John Evelyn, writing many years later, described Wilton garden as "heretofore esteemed the finest in England."

The accession of William III naturally coincided with a revival of Dutch influence. Even in Elizabethan times Dutch influence had made itself felt in this country, largely owing to the publication in 1583 of de Vries' designs. Whether any gardens in these islands were laid out from these plans is unknown, but they undoubtedly set a fashion.

The cult for orangeries was certainly due to Dutch influence, for in Holland the cultivation of the fruit had been brought to great perfection. The most important Dutch book on the subject—Jan Commelyn's Nederlantze Hesperides (1676)—was translated into English with the title The Belgick or Netherlandish Hesperides that is the management, ordering and use of the Lemon and Orange Trees made English by G. V.N. Orange trees brought from the Royal garden at Het Loo to Hampton Court were alive at the beginning of this century. To the Dutch influence also was due the excessive use of topiary work which characterized our gardens in the late seventeenth century. The finest example of a Dutch garden made at that period still in existence is Levens, and the topiary work there is probably the most remarkable in the world. Although Dutch in character the garden was laid out by Beaumont, a Frenchman, who had been a pupil of Le Nôtre.

The most attractive and characteristic features of gardens in Queen Anne's reign were the dignified walks between high hedges. They differed wholly from the sheltered walks of Tudor and Stuart times, for not only were they far more extensive, in keeping with the increased size of gardens, but the trees were clipped in a remarkable fashion. The trunks were kept bare up to a height of about fifteen feet and then the trees were allowed to grow naturally, thereby giving pleasant shade to the walks; or the branches were pleached to form a solid wall, a method suggestive of Dutch rather than French influence. In Williamson's Oxonia depicta (1717) the garden of St. John's College is shown with yews clipped in this way, surrounding four square gardens on the site of what is now the great lawn. In Trinity garden the yews are depicted clipped to resemble panelling. In Fairchild's Catalogus Plantarum (1723) arcaded walks of clipped yews are shown.

In Kips' views, Britannia Illustrata, Les Delices de la Grande Bretagne, Plot's Staffordshire, Atkyns' Gloucestershire, Dugdale's Warwickshire, and similar works, the large gardens of the period are so well depicted that it is easy to visualize the varied types of formal gardens of the late seventeenth and early eighteenth centuries, and to note the skilful combination of the earlier type of formal garden with the stately avenues and walks imitated from the French. But for the homelier type of garden it is essential to consult the small practical manuals of the period. For instance, in Charles Evelyn's Lady's Recreation (1717), the only book written during the eighteenth century for women gardeners, we are given a delightful illustration (fig. 28) and brief description of "a lady's garden" of the early eighteenth century. From the house a walk of orange trees "whose fragrant Smell especially

in the Blooming Season excels that of all other Plants and Flowers" leads to "Greens and Borders set with Flowers." This enclosure is adorned with a fountain "of the best architecture" and "an excellent contrived Statue." Beyond is the wilderness "and being no longer pleas'd with a solitary Amusement you come into a large Road where you have the Diversion of seeing Travellers pass by to compleat your Variety." Another pleasing small garden is depicted in John Laurence's Clergyman's Recreation (1714). It is not surprising that this book went through six editions in twelve years, for Laurence writes so simply and unaffectedly of the joys and trials of gardening. When he arrived at his new living he found "what they used to call a garden," a wilderness of couch grass, nettles, and gooseberry bushes, the soil being heavy, white clay within six inches of the surface. Undaunted, however, he turned to with a will, secured "the kind help of the Neighbours" and within three years had made a well-stocked garden, presumably the one depicted in the frontispiece of his book "I thank God this sort of Diversion has tended very much to the ease and quiet of my own Mind; and the Retirement I find therein by Walking and Meditation, has helped to set forward many useful thoughts upon more Divine subjects. . . . In the meantime I cannot but encourage and invite my reverend Brethren to the love of a Garden; having myself all along reap'd so much Fruit from it, both in a figurative and literal sense."

NEW ROSES.

By H. R. DARLINGTON, M.A., F.L.S.

[Read October 24, 1933; Mr. W. R. OLDHAM, J.P., in the Chair.]

WHEN I had the honour of addressing the members of the Society in 1920 I took occasion to consider the qualities we desired to find in our garden Roses, illustrating them by the merits of that popular Rose 'Mme. Abel Chatenay,' and pointing out its defects.

The object of my paper this afternoon must be to consider, so far as I can, the development that has been achieved since that date, and to estimate to some extent how our gardens have benefited from the more recent introduction of new varieties.

These new varieties continue to be introduced in considerable numbers, at the rate of some 150 to 200 annually, and are found to be, for the most part, slight variations on existing varieties. A few of them possess some merit, such as increased vigour, or new or improved colour or form, which enables us to keep the new Roses for a time in our gardens, but the majority quickly disappear from the trade catalogues and the exhibition table.

The number of varieties for which most of us can find room in our gardens is rather strictly limited, and except where a trial border is kept for the reception and study of new introductions, most of us require to be persuaded of the substantial merits of the new Rose before we are willing to oust an established favourite in its favour.

Occasionally, however, we find some fresh break, as when M. Pernet Ducher gave us the group which bears his name, and which is now rapidly becoming merged in the Hybrid Teas. I shall have one or two such fresh breaks to chronicle, but it is always difficult to forecast whether such a fresh break when it arises, and however good it may itself be, is to form the foundation of a new and popular development or to remain where its originator left it. A well-known example of the last-mentioned case is that of the Penzance Briers, which have, in effect, not materially improved since they were left at the death of Lord Penzance.

Another cause of the disappearance of once popular Roses is the deterioration of the stock, and I think this often affects comparatively new varieties. There are undoubtedly many kinds which grow and look well for a year or two and then rapidly become of poor quality and are thrown aside. Others become for many years popular Roses, and gradually seem to lose their previously good constitution or habit. Instances of the last case are to be found in 'La France' (1877), 'Bessie Brown' (1899), long the most frequently exhibited of all Roses,

and 'Mildred Grant' (1901), which now refuse to give us the flowers with which we were once familiar.

For garden purposes Roses may conveniently be divided into three groups:

- I. Hybrid Teas, including the Pernet group and a few Teas.
- 2. Polyantha Pompons, usually bunch flowered dwarf plants.
- 3. Climbers, including Wichuraiana and other ramblers and climbing sports of the H.T.'s.

There are a few kinds which are best grown as bushes, large or small according to the variety, and which do not fall into any of these groups; such, for instance, are 'Allen Chandler,' 'Phyllis Bide,' and most of the Rugosas, but for the ordinary gardener the classification will suffice.

The species of wild Rose and their hybrids are best treated as flowering shrubs, and are outside the limits of this paper. Many of them, particularly some recent introductions from China and the East, are of considerable garden value, not only by reason of their flowers, but on account of the beauty of their foliage and fruit, and occasionally their autumn tints are very lovely, but they do not belong to the Rose garden proper.

Possibly there may be something in what Alfred Smee wrote of the Rose sixty years ago:

"The love for any particular florist's flower is subject to the caprice of fashion, and varies year by year. The pet of one period is the discarded one of another; but the wild flower satisfies the eye from century to century, and what delighted Horace and Virgil will continue to delight our grandchildren's grandchildren. With regard to the innumerable varieties of hybrid Roses, who is to decide on their relative beauty?"

However this be, and no doubt in the wonderful variety of colouring of the modern Rose each of us will have his peculiar preference, there is one point on which everyone is agreed—namely, that to make a good garden plant the Rose must be a good grower, carrying strong and healthy foliage. Without these characters no Rose is worth consideration as a garden plant.

THE HYBRID TEAS.

The Hybrid Teas are, and seem likely to remain for some time, the mainstay of the Rose garden.

They are conveniently grown in beds or borders and possess beauty and richness of colour and form, and often delightful fragrance.

We are to expect in the development of this class slight and gradual improvement rather than anything of a revolutionary character such as occurred when some twenty years ago the Pernet groups were coming into being and providing the source from whence the highly coloured Roses of to-day have descended.

It will be convenient in considering this group to make a rough classification according to colour, and in each of these colour groups we shall find special qualification desirable.

This rough classification is as follows:

- I. Crimsons.
- 2. Whites.
- 3. Pinks.
- 4. Yellow and orange.
- 5. Salmon and other coppery and orange-scarlet shades.

CRIMSONS.

In addition to good growth and habit of the plant, the qualities we most desire to see improved in our crimson Roses are:

- I. Fastness of colour.
- 2. Fragrance.
- 3. Good form and carriage of the flower.
- 4. Freedom and continuity of flowering.

The older crimson H.T.'s, such as 'General McArthur' and 'Richmond,' were apt to "blue" in the sun, so that the flowers rapidly became dull magenta, and the August flowering was of little account, only the early and late flowers being of a good crimson.

Some of the scarlet-crimsons, such as 'Paul's Scarlet Climber' and 'K. of K.,' had faster colours, and showed much less tendency to blue, but they were scentless, or nearly so, and the attempt to obtain a faster colour in the crimsons seems, at least at first, to have carried with it a quality of scentlessness.

This is unfortunate, because the public usually expect fragrance in a crimson Rose, though perhaps it is really more fully developed in the pinks.

It results that while we usually find fragrance in the deep crimsons, it is less pronounced and often absent in the bright or scarlet-crimsons, though in time it may gradually come even there. Good form is particularly to be desired in these Roses. We have Roses like 'Étoile de Hollande' and 'George Dickson,' of most delicious fragrance, but usually with such confused or quartered centres and poor form as the flower opens that they are of little use for decoration, and we have some otherwise interesting Roses of good form like 'Mrs. George Geary,' or fine perfume as in 'Lady Helen Magtona,' which most of us will rule out because their weak flower stems spoil the carriage of the flower.

Freedom and continuity of flowering are badly wanted in this group. It must always be a question of degree, no Rose being absolutely continuous through the season, though some may approach it. We had something near continuity in 'Richmond,' though many of the flowers were valueless, and perhaps 'F. J. Harrison 'and 'Waltham Cross' both approach this quality.

In reviewing the crimsons, however, we must admit that there is yet no individual possessing all these desirable qualities. We may hope that some are approaching that end, and that it is possible we may obtain such a Rose in time.

Two good crimson Roses appeared early in our period; these were 'Mrs. Henry Winnett' (1922) and 'George H. Mackereth' (1924). Both are a darkish crimson. 'Mrs. Henry Winnett' is a strong and vigorous grower, and 'George H. Mackereth' nearly but not quite as strong. Both are fragrant and produce a fair proportion of full and well-shaped flowers, carried well on the stems. Perhaps I get a rather larger proportion of well-shaped flowers from 'Mrs. Henry Winnett.' In neither is the colour absolutely fast, and 'George H. Mackereth' will sometimes "blue" badly.

Neither is quite continuous and there are green gaps between the flowerings, though each produces a tolerable number of flowers through the season.

'F. J. Harrison' (1924) has proved with me one of the most continuously in flower of this group. The individual flowers, however, are not so good as the two first named, nor has it their fragrance.

'Sir David Davis' (1926) is a slightly brighter crimson and its flowers are often well formed, though the proportion of good flowers is not so high as that of 'Mrs. Henry Winnett.' 'J. C. Thornton' (1926) is also worth growing.

'Waltham Cross' (1927) is nearly single, but is one of the brightest and most continuously in flower of the crimson Roses. It grows well and makes a really good and attractive bed.

Skipping two years, we get three interesting new Roses:

'The Daily Mail Scented' (1929) is a very dark rose of lovely perfume and, when well grown, of good form. It does not exactly "blue" but the petals burn badly in hot sun, and the plant has not proved so vigorous with me as to form a really satisfactory garden plant, but it may be worth growing in an inconspicuous place for its fragrance.

'W. E. Chaplin' (1929) has very finely shaped flowers, nearly all of which come of a good bright crimson colour. This is noticeable and is retained and the plant grows well. Its faults are two: it has scarcely any fragrance, which is the more remarkable in that it is said to have come from scented parents, and, with me, it has been somewhat sparse in flowering; still, it is without doubt of very fine form and is worth growing for this alone. Maiden plants have done rather better in continuity of flower.

'E. G. Hill' (1929), though not so beautiful a flower as the last, has much merit and has good all-round qualities which seem likely to carry it far. Its colour is specially well retained even in hot weather. It has considerable fragrance, and its flowers are carried well; many of them, but not all, are well shaped, and while not continuous it is free flowering.

'Essence' (1930) is also a useful little Rose. It is a medium-sized flower of velvety crimson, which keeps its colour well and is very fragrant. Most of the flowers are of fairly good shape and some are beautiful. The plant grows well and flowers a little more freely than most crimson Roses, but it is not continuous.

'Night' (1930) is a very dark crimson and, at its best, very attractive. It is fragrant and keeps its colour fairly well. Its fault seems to be that it should be rather stronger in growth.

'William Orr' (1930) is another fragrant Rose of good colour and vigorous growth, best, I think, in cool weather, for it was not so good and had not so large a proportion of well-shaped flowers in 1931 or 1933 as it produced in 1932.

'Gartendirektor Nose' (1931) seems promising, but I have only grown it for one year.

Finally, there are two crimsons coming out this autumn that we shall await with interest. One is 'Southport,' a well-shaped flower, and as I have seen it in the Rose Trial Grounds very bright and free, but probably without much fragrance. The other is a darker crimson, 'Colonel Sharman Crawford.' It seems highly fragrant, and as shown appeared shapely in form, but in both their merits as plants in the ordinary garden remain to be tested.

WHITES.

In the white and other pale Roses the qualities we seek are fragrance and a thick and substantial petal which will stand some rain without becoming spotted. In this group there is generally little difficulty in finding Roses of good form.

The popular 'Frau Karl Druschki' was practically scentless, but 'Marcia Stanhope' (1922), said to be a seedling from it, is delightfully fragrant. It is a very dead white and of beautiful form, though readily damaged by rain, and the plant has to be kept free from mildew, to which it is subject.

'White Ensign' (1925) is a pretty little bedding Rose of good form and very free, but it has little fragrance. That quality is, however, well developed in 'Abol' (1926), the flowers of which are usually well shaped though more rounded and not so pointed in the centre as some of the whites. These qualities also appear in 'Margaret Ann Baxter' (1928), which is useful for bedding.

'Elizabeth Arden' (1929) is a very lovely flower, often nearly perfect in shape, but it is apt to spot with rain.

The greatest improvement in texture of petal seems to appear in 'McGredy's Ivory' (1929), which has a very long pointed bud and high centre, making it an acquisition.

'Swansdown' (1929) is well named and beautiful in its first flowering, the later flowers being of less value.

'Edith Krause' (1930) seems an acquisition. It is free flowering and has a tinge of green which is attractive.

PINKS.

The pink Roses introduced during this period have been numerous, but I shall confine myself to very few. It is in this group that we should chiefly look for strong perfume and shall have little difficulty in finding it.

The period opened with two excellent garden Roses, one the lovely and ever popular and fragrant bicolored 'Betty Uprichard' (1922). Everyone knows it, and it is one of the showy Roses of the garden. Its only faults are that the flower is thin and it takes some time to grow the long decorative shoots which carry the terminal flower.

The other, 'Mrs. Henry Bowles' (1921), is also well known, and still one of the good ones. Its bed is almost always in flower and it is a most satisfactory garden Rose, its chief defects being that its fragrance is not pronounced and its colour a trifle hard, though this seems to come softer in the north of England.

'Dame Edith Helen' (1926) is a notable Rose as being one of the most fragrant we possess. It is a good grower and the blooms are carried upright and, after the first crop, nearly all the flowers come of fine shape. Its chief defect is that the early flowers have frequently caught cold and are green centred or quartered. This defect disappears after the first flowering. The pink colour must, I think, have an almost imperceptible trace of blue in it, for care is required not to place it next to orange tints.

'Mrs. A. R. Barraclough' (1926) is the most notable addition to the pink group of garden Roses during our period. It is a fine grower and the bed has flowers in it almost continuously through the season. The flower is high centred and well formed, with a tinge of yellow towards the base of the petal. It is fragrant and nearly all the flowers are of good form.

'Dainty Bess' (1926) is a single pink Rose with reddish stamens. A spray of it, particularly if picked in the bud stage and opened indoors, is very beautiful. The plant grows well and flowers freely and it may be considered as a new break in single Roses. Its defect with me has been a slight tendency to attack by black spot, which, however, can be kept in check with fungicides.

Of the many sports from 'Mme. Butterfly' I may mention two, 'Rapture' (1926) and 'Lady Sylvia' (1927), which are a slightly deeper pink than their parent, but scarcely distinguishable from one another.

'Rose Berkeley' (1925) is a very beautiful flower with a tinge of orange-salmon in the pink. The plant is a strong grower of somewhat spreading habit and the flowers are full and generally well formed. It is worth growing for the beauty of its individual flowers, and makes a good bedder.

'Senorita de Alvarez' (1931) is another nearly single Rose of a deep glistening pink. It is attractive, but I require further trial to be certain that it flowers freely enough for a single Rose.

'Picture' (1932) is a prettily-shaped medium-sized flower, carried on a nice bushy little plant, which seems free flowering and promising as a bedding Rose.

YELLOW AND ORANGE ROSES.

These flowers and the next group (salmon, etc.) have for the most part originated from crosses with the Pernet group, heralded by 'Rayon d'Or' (1910). They often have shiny foliage, which suffers little from mildew, but is attacked in some cases by black spot. Their defects have usually been that the flower is thin, having an insufficient number of petals, and the centre petals are too short, while the quality of fragrance is often low. They have, however, given some wonderful colours to our gardens.

'Mabel Morse' (1922) was one of the first to show improvement in this respect, the flower being a good clear yellow, full and often well formed, and possessing some, if not pronounced, fragrance. The plant, however, is not a strong grower as a cutback, and seems to require a good deal of moisture; the only place where I have been able to keep cutback plants of this Rose for any length of time has been in a sunk garden, where presumably it receives more moisture than it would in most parts of the garden.

'Mrs. Beatty' (1926) is another well-formed flower of clear yellow, and fairly full; but here again the plants, though longer lived than those of 'Mabel Morse,' are rather dwarf in habit.

'Julien Potin' (1927) is, however, a strong grower. It has large, often well-formed flowers of a deep yellow. Its defects are (1) that the opening flowers ball in wet weather, and the happening of a couple of days rain as they are just opening may ruin the promise of the season, and (2) that the deep yellow colour is not uniformly maintained. The colour may become quite pale and uninteresting, moreover the shape of the later flowers often leaves something to be desired. Notwithstanding these defects it is so good a garden plant that it will probably be grown till we get something better.

'Adèle Crofton' (1928) and 'Lady Forteviot' (1928) are both decorative Roses of beautiful and unique colouring, but the flower in each case is too thin to expect a long life for them.

'Golden Dawn' (1929) has come to us from Australia. It is a light yellow, flushed or marked with reddish-pink, of fine form, and remains in flower the whole season. It may be considered a new break, for its parentage is said to be 'Ethel Somerset' (H.T.) crossed with a Tea Rose called 'Elegante'; it thus lies midway between the H.T.'s and Teas. It was introduced by the raisers as an H.T., which I think it must be, but some have preferred to place it among the Teas. It is quite vigorous and very hardy and makes good compact bushes such as are suitable for bedding.

'Barbara Richards' (1930) is of somewhat the same colour as the last, but a little paler. It often makes a beautiful flower, though the later ones are less well formed, and as a bedding plant it is not shown

in the garden. It is, however, remarkable for its fragrance of the "old Rose" character, and is probably the first Rose of its colour to provide this perfume.

'Max Krause' (1930) is a well-shaped deep yellow Rose. The plant is a strong grower, but as a cutback it has not yet given me the number of flowers I should wish.

'Lilian' (1931) is a well-formed flower of rather paler yellow, and the question here seems to be whether it will prove a stronger grower than 'Mrs. Beatty,' and so supersede that variety.

SALMON AND OTHER COLOURS TO ORANGE-SCARLET.

This group has perhaps received the largest influx of new varieties, but if we agree to exclude those that are too thin or of uncertain or unsatisfactory colouring the numbers will assume manageable proportions.

One of the best came early in our period.

'Shot Silk' (1924) is well known and popular; the colour is a cherry-pink, or rather that is one of the colours, for it passes through many stages, the flowers often fading off to a pale pink. It cannot be called a well-formed flower, for the centre petals are short and the outer ones incurved, yet it is often beautiful, and it is delightfully fragrant, with a rather sweet perfume. The plant grows well and has a good, rather bushy habit, with shiny leaves, free from mildew but subject to black spot. In summer the flowers are best picked when the buds have opened enough to show the colour and then opened indoors. My beds are scarcely ever without flowers.

'Charles P. Kilham' (1926) is a strong-growing plant bearing medium-sized flowers of a strawberry-pink. They are very conspicuous in the garden, but are of poor shape, the centre being usually confused and the centre petals rather short, and I do not notice much fragrance; but it is a good garden plant.

'Patience' (1927) resembles the last in colour, which, however, is somewhat deeper and harder, and the flower is of a decidedly better shape. The plant, however, is not so good a grower, nor has it such good foliage as that of 'Charles P. Kilham.' It makes a good standard, however, on rugosa stock, and is perhaps just worth growing in small quantity.

'Edith Nellie Perkins' (1928) makes a vigorous plant, carrying flowers somewhat resembling 'Mme. Abel Chatenay' in form, but the colour is different, the Chatenay pink being replaced by a brick red, which is quite effective and pleasing.

'May Wettern' (1928) is also a bicolor flower and a strong grower, pinker than the last named, and making fine-shaped flowers if disbudded; it is free flowering, but not continuous.

'Mrs. S. Paton' (1928) makes an effective bed; the colour is something between pink and orange. It is fairly free and flowers are usually to be found on the bed, but there are green intervals.

'Flamingo' (1929) is chiefly noticeable for its fragrance; the colour often resembles that of 'Lady Inchiquin,' but is less striking; but for its fragrance it would not be worth growing.

'Mrs. Sam McGredy' (1929) is a long way the best of the new Roses of this group; it grows well and the young foliage is such a lovely red that it is almost worth growing for this alone. The colour is generally described as coppery-orange-scarlet, and is that of a redder 'Mme. Edouard Herriot,' but the flowers are fuller than those of that Rose and often well shaped, and it is a more vigorous grower.

In the Hybrid Teas, therefore, progress during our period has for the most part taken the form of gradual development towards a better garden Rose, and on the whole it may be considered satisfactory. There have been two which may be considered new breaks, namely, the single Rose 'Dainty Bess' and the full yellow 'Golden Dawn'; but apart from the value of the individual plant constituting the break the value of a new break chiefly depends on the extent to which it can be developed. The break may always stop with the individual, and as yet there is no evidence of this further development in either case. Perhaps it is too early as yet.

THE POLYANTHA POMPONS.

This group has recently gained considerably in interest by reason of a new break that has arisen, and appears to be becoming established in the group.

On crossing the multiflora Rose (otherwise known as Polyantha) with Tea Roses, three groups resulted: first, the climbing or rambling Roses of our gardens, such as 'Tea Rambler' or 'Mrs. Flight,' vigorous growers of climbing habit which only flowered once; secondly, Roses of the habit of a large bush which flowered again after the first flowering—these were at one time developed by Mr. Peter Lambert, but never became popular in this country; and finally a third class, mostly of somewhat dwarf plants which produced their bunches of small flowers continually throughout the season. These are the dwarf Polyantha proper, and have become very popular for bedding purposes; instances are 'Mrs. W. H. Cutbush' and the 'Orleans Rose.'

The course of development in the group has been first the production of pale pink sports, such as 'Coral Cluster,' and crimsons, such as 'Nurse Edith Cavell,' or 'Reine Elizabeth.' Next came the development of a group of very brilliant orange-scarlet flowers, which one might arrange in a series as follows: 'Golden Salmon,' Mrs. Anne Hudig,' 'Gloria Mundi,' 'Paul Crampel,' the last being the most brilliant and named after the Geranium of the same name, which it somewhat resembles in colour. The colour is very gay, bright, and striking, but does not appeal to all tastes.

These orange colours appear to have arisen as sports from crimson varieties, and most of them frequently produce shoots carrying flowers which wholly or partially revert to the crimson type. This is a

defect which possibly may disappear in time, but is at present troublesome.

These plants raise a certain difficulty as to the position in which they are to be placed in the Rose garden, because their colour clashes badly with any colour containing pink in its composition. I have moved my plants of these varieties to different positions every autumn, but am not yet quite satisfied with the result.

In 1924, however, Mr. Poulsen produced a pair of roses which have quite revolutionized this group. These were 'Else Poulsen,' bearing loose panicles of nearly single pink flowers, and 'Kirsten Poulsen,' with flowers of a light brick red. They are stated to have been obtained by crossing the H.T. 'Red Star' and 'Orleans Rose,' the dwarf Polyantha. They grow strongly, forming shapely bushes about 3 to 4 feet high, and, with me, are constantly in flower through the season.

The new group is thus intermediate between the H.T.'s and the dwarf Polyanthas properly so called, and in order to distinguish them they have been called Hybrid Polyanthas.

'Else Poulsen' is a specially beautiful plant, the effect of the clean pinkish flowers being set off by the young foliage, which is reddishgreen and very attractive. The foliage of 'Kirsten Poulsen' is of a lighter green, and the colour of the flowers, though pleasing when they are fresh, is not to me equally attractive. Neither of them has fragrance.

The group has been developed in 'Greta Poulsen,' a deeper pink, and 'D. T. Poulsen' (1930), ('Orleans Vesuvius') crimson, both of which are semi-double and not such strong growers as 'Else' and 'Kirsten Poulsen'; and finally in 'Karen Poulsen' (1933) we find single flowers of a fine and striking bright crimson colour, which has been well shown this season, and which, as seen in the Rose Trial Grounds, seems likely to make a brilliant bedder.

This is a most interesting group, but it seems to me that down to the present 'Else Poulsen' is without a serious rival.

CLIMBING ROSES.

After something of a pause following the introduction of the multiflora and Wichuraiana hybrids in the early years of this century a considerable number of climbing Roses and climbing sports have appeared. The general tendency of the raisers has been to aim at replacing the small and bunch-flowered types by flowers of a rather larger size. Instances of this are to be found in 'Dr. Van Fleet' (1910), 'Paul's Scarlet Climber' (1916), 'Alida Lovett' (1917), 'Emily Gray' (1918), 'Le Rêve' (1923), 'Mary Wallace' (1924), and 'Easlea's Golden Rambler' (1932), and if this is not carried too far it is satisfactory.

'Alida Lovett' and 'Mary Wallace' are both beautiful flowers and look well on the plants when in bloom, while 'Golden Rambler' seems promising. For some time past attempts have been made to obtain perpetual-flowering ramblers. 'Paul's Scarlet Climber' always has a certain number of autumn flowers, and a few adventitious flowers are usually found on 'Purity' at that time.

'Braiswick Charm' (1914) showed distinct tendency to flowering again, while the little pink Rose' Dorcas' flowers twice and sometimes three times in the season.

We were all interested, therefore, in the advent of 'New Dawn' (1932), which was to be a perpetual form of 'Dr. Van Fleet,' and certainly its performance in the Rose Trial Grounds in the autumn of 1932, when the plants were covered with flowers, seemed to bear this out. When, however, we got it this year into our gardens it failed to come up to expectation. Perhaps the drought was too much for it, or we ought not to have expected much from a climber in its first year, and it may do better next year. Be that as it may, we are not yet in a position to say that we are in possession of a really satisfactory perpetual rambler.

This at least is the direction in which we should like further improvement.

Of course we have the climbing sports of the garden varieties of H.T.'s, which are now numerous, but these have not the easy growing qualities of the ramblers.

It is difficult to make most of them into satisfactory pillars; they do better grown on wall or trellis, also they do not all "climb," and often become merely strong growing forms of the plants from which they originated; moreover, the very strong growers often fail to flower freely enough in the autumn to make a display.

Nevertheless, these climbing sports have found a distinct place in the Rose world and in appropriate positions are very useful.

In the quality of fragrance among the rambler Roses, so far as I can judge, there has been little advance during the last ten years, and 'Evangeline' seems to be the only rambler with strong enough perfume to scent the garden on a summer's evening.

THE CULTIVATION OF THE FIG.

By E. A. BUNYARD, F.L.S.

[Read October 5, 1933; Mr. C. G. A. NIX, V.M.H., in the Chair.]

THE Fig has long been grown in this country, and to sketch even briefly its interesting history would far outrun the limits of this lecture.

A native of Syria and neighbouring countries, it did not reach the Mediterranean littoral until a comparatively recent date in the history of Greece. According to Hehn,* "At the time and in the scenes embraced by the Iliad, the fig tree was not yet found on the Western coasts and Islands of Asia Minor." He later gives Archilaus (700 B.C.) as the first writer whose reference to the Fig can be taken as authentic and not a later interpolation. It is known that in the reign of Tiberius the finest varieties were imported from Syria.

The Fig, then, like so many plants of the Mediterranean flora, has been introduced by man, and each country has its own varieties.

It is usually said that the Romans brought the Fig with them to England, and there are a few references in Tacitus Solinus which seem to support this statement.

We are on sure ground in the thirteenth century, when MATTHEW PARIS, speaking of the severe weather of 1257, tells us that Figs "were almost quite destroyed."

In the time of Henry VIII it is said that Cardinal Pole brought back Figs from Italy, and a tree at Lambeth Palace was long considered to be one of his introductions.

In Gerard's day (1597), we find the Fig definitely established, and Parkinson in 1629 describes three varieties.

The cultural lesson we gain from these facts is that the Fig is a native of lands of great summer heat and winter rainfall, and the frequent failure of fruit Figs is very largely due to our cold winters and lack of sun, which does not mature the wood sufficiently.

The use of a wall is thus necessary in most parts of the country, and this has led to the growth of the Fig as a fan-trained tree, a most unsuitable form of tree from the point of view of fruit production.

If the average Fig on a wall is studied, it will be found that the fruit is not produced to any extent on the wall but on the laterals which stand away from it, and especially at the top of the wall where least shelter is provided. Thus the fan-trained tree is most successful where it is least a fan, as, like other fruits, the vertical shoot is less productive than the horizontal one. The ideal form is the standard or spreading

^{*} Wanderings of Plants and Animals. Victor Hehn, quoted from translation of STALLYBRASS.

bush, and I suggest that those who have no available walls or greenhouse should try a Fig in a deep frame, such as a melon frame, planting

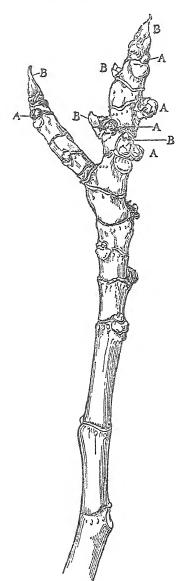


Fig. 29.—Fig Shoot showing Young Figs (A), Growth Buds (B).

the tree in the centre and training the branches on a horizontal trellis as melons are grown. The trellis can conform to the shape of the frame, sloping from back to front, and the lights will protect from frost in winter. All shoots should be tied down to the trellis, and this horizontal position will greatly increase their fertility.

Habit of Fruiting.—The Fig produces fruit upon the current year's growth, some of which may ripen in a favourable year, and at the tips are produced small fruits which do not develop in the same year but remain as fruit "buds," and it is from these that the early fruit will be produced the following year (fig. 29).

If these tips are pruned away we are obviously cutting off our supply of fruit for the next year, and equally if frost or cold winds kill the unripened tips our crop is lost. This is the reason for most of the failures in Figs, and the cultural methods must be such as to preserve these embryo fig "buds" for next season, as it is from these that the main crop of fruit will be produced. The figs at the lower part of the shoot will develop and ripen in warm years and these form the autumn crop. When conditions are not favourable, they develop only to half their normal size, or less, and will perish in the winter. Therefore no fig which looks anything like a fig is of any use for the next year's crop, it is only the small "buds" or embryo figs, which are no larger than a grain of pepper. which are of any use.

Unfortunately, these are always situated at the tip of the shoots and

thus in their least ripened part. Can we by any means produce such buds at the lower part of the shoot where the wood is riper?

The answer to this question is given in a very interesting paper read before this Society by the Rev. George Swayne on September 19,

1820. He advises that all the young figs which appear after midsummer be rubbed away as soon as they can be seen. There will then be produced at the base of the leaf two small embryo figs which will not swell out until next spring. These being produced on the wellripened base of the shoot will stand a much better chance of winter survival than those on the softer tips. The rubbing out will have to be done several times, the upper leaves naturally developing their figs later than the lower.

Soil and Aspect.—It is obvious that the warmest possible aspect must be given not only to ripen the fruit but for winter protection from frost and the even greater enemy, cold spring winds. For soil, a light, well-drained loam is desirable, but as we find the Fig on many soils it is not necessary to emphasize this point too seriously. It thrives on the thin soils on chalk, on sand (if lime is added), and on fairly heavy clays if drained. Too vigorous a growth means, as in most fruits, a sacrifice of fruit, and a soil that will satisfy but not excite is what is needed. Lime or mortar rubble should always be added in lime-free soils: a cartload of bricks and stones in the bottom of the hole will do good. In Italy the Fig is said to be enamoured of stones and cisterns. It might be added here that too vigorous growth can always be checked by removing half the leaves on the offending shoot.

Pruning.—From the habit of growth and fruiting as above described, the Fig, if unpruned, makes a fresh growth each year from the terminal bud and nowhere else. Thus the older parts of the branch are not productive, just as in the peach, and a method of replacement of fruiting wood is necessary. Fortunately the Fig, though often showing no visible buds, nearly always breaks when cut back hard, and so, instead of allowing the shoots to elongate equally, one here and one there can be cut out every year in a fan or bush, thus getting a fresh growth from below.

As the short growths made each year are fruit-bearing structures nothing in the way of spurring must, of course, be done—the only permissible pruning is cutting back hard to form new replacing branches, as described above.

Figs are remarkably hard to kill, and very old trees which are bare on the lower branches can be actually pollarded back to make a fresh start from below, an excellent method of rejuvenating an old tree.

As all Figs are raised from cuttings and not grafted, there is no fear of the stock coming up as in other fruit trees.

Winter Protection.—This is of great importance and is much neglected in English gardens. The young embryo figs are tender and very subject to frost and cold wind damage, and some method of sheltering them through the winter and especially early spring must be devised. On the sandy soils of Argenteuil near Paris the branches are buried in the soil; with us it is more convenient to tie bracken in the branches or, better still, place spruce boughs all over a wall tree. The needles fall off slowly in spring and thus gradually harden the young fruits. A projecting glass shelter at the top of the wall is of great

benefit, and indeed for all wall fruit it would greatly increase the value of the crop as much by keeping off rainfall in flowering time as by the extra heat gained.

A fan-trained tree can be unfixed from the wall and brought down to the base of the wall and covered with lights.

Pot Cultivation.—Figs are very suited for pot cultivation: the restriction of the roots tends to check too vigorous growth, and well-ripened wood means better crops. If heat is available it is easy to have figs from January to October, and there are few fruits which can give so long a season in this country.

In cold houses figs may be had from June to October, and the pots can, after fruiting, be stacked closely together, giving space for chrysanthemums in the winter months.

Figs grown in pots do not give such large fruits as those planted in borders, inside or out, but they more than make up for this by an added sweetness.

The best form of tree is a flat spreading bush, which is the shape most Figs desire naturally to take, and the pots should be II inches across and about I2 inches deep or thereabouts. A sandy loam is advisable, and to this should be added a generous allowance of mortar rubble if available, not broken down too finely. Failing this, some chalk about the size of a cob nut can be freely introduced with advantage.

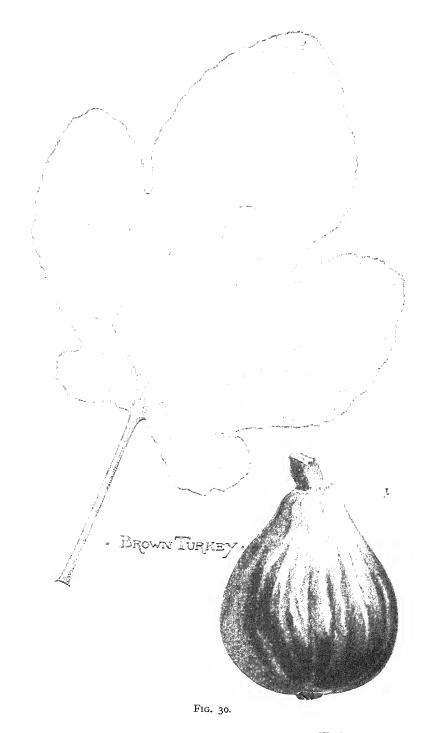
The plants having been, we presume, purchased in pots, the ball can be very substantially reduced without harm, roots being very freely made again. Firm potting is essential and, of course, good drainage. For forcing, re-pot in September; for cold house treatment in November or December. After potting, place in the house or under a sheltered wall, not forgetting to water if needed, and the danger of frost must be carefully guarded against as emphasized above.

Room should be left in the pot for a top dressing, and some well-rotted stable or cow manure added to an equal bulk of loam should be available for this and be applied when growth begins. The pots should be placed just far enough apart to prevent the leaves touching, and they need not be near the glass—the Fig shows no tendency to "draw up" as do many plants.

Figs are avid of water and will accept and use a good allowance twice daily.

When growth begins little pruning will need to be done, an over exuberant branch can be checked by pinching out the terminal bud or, if very vigorous, crush the tip of the green shoot with the fingers and growth will cease.

A second growth in a cold house will start after midsummer, and on this the autumn fruits will be produced. This gives a chance to cut back to a wood bud to make a fresh growth where needed. The "Swayne" method of rubbing off the young figs to make new fig "buds" for next year should be practised as soon as the figs can be seen to be figs and not growth buds.



[To face p. 64.



Fig. 31.

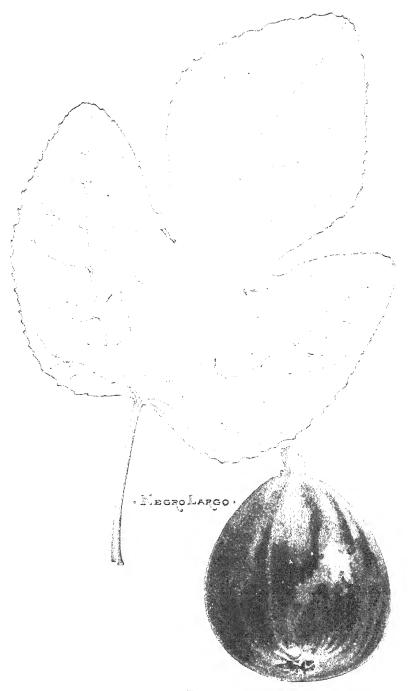


Fig. 32.

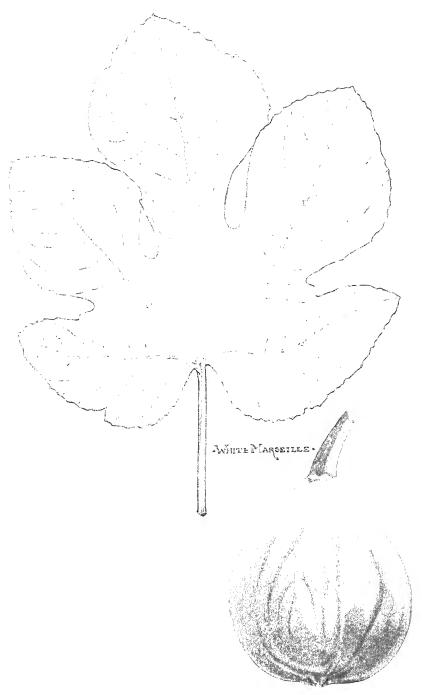


Fig. 33.

[To face p. 65.

The Forcing of Figs.—A small amount of heat is of the greatest help in securing a crop of figs and there is no fruit which gives a better return for such expenditure.

A low temperature even will greatly hasten the ripening of both the first and the second crops. For forcing proper, re-potting should be done in September and the plants brought indoors as soon as frost threatens. Starting with a moderate temperature in January—say, 40°—and raising it to 60° when growth is moving, fruit should be ripe in May. Pot Figs which have been forced and have ripened their crop in May are suitable for producing a crop of winter figs if brought into heat in August. The fruit thus produced is not quite so rich as that produced in more sunny periods, but I have tasted some excellent fruit at Christmas thus produced. Stove temperature is easily supported by the Fig.

An old method of forcing was a combination of the hot-bed and the forcing house.

A bed of stable manure and oak leaves in equal parts was spread in the house 3 feet deep and on this the pots placed. A week after a temperature of 65° was maintained and when the heat of the hotbed had abated a little, the pots were sunk into it to their rims.

The roots soon run into the manure and produce greater vigour than the non-bedded pot plant, and fruit was gathered from April to October.

Under forcing, care must be taken to keep down mealy bug, the worst enemy under glass, and scale, both of which are more likely to appear in heated houses.

Varieties of Figs.—There is, unfortunately, no good monograph of the Fig available and the question of nomenclature is, therefore, rather confused. On this account I can give only the names which are current in this country and cannot always decide if they are identical with the varieties grown under these names in Mediterranean countries. The varieties named are those which experience has shown to be the most reliable in our climate and the main four 'Brown Turkey' (fig. 30), 'Brunswick' (fig. 31), 'Negro Largo' (fig. 32) and 'White Marseilles' (fig. 33) can be easily recognized by their leaves, as the illustrations show.

The leaves coming from old wood are often out of character, being less cut than those on young wood, reversing the case of the mulberry, when the contrary is observed.

Varieties recommended.—Brown Turkey (fig. 30).—This is the variety most commonly grown; more are planted, I imagine, than of all the other varieties put together, owing to its hardiness and productivity.

Mid-season, medium, sometimes very large on old trees, colour chocolate-brown, slightly ribbed with prominent oval dots of a lighter colour. Flesh deep red, sweet and rich. Growth moderate, very fertile.

This has been long grown in this country and is illustrated in the "Florist and Pomologist," 1880, p. 145.

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LOEFLING, producing leaves and flowers in autumn, is that later called Merendera Bulbocodium by RAMOND; LAPEYROUSE * made this clear more than a hundred years ago. The Swiss plant of CASPAR BAUHIN is probably C. alpinum, a quite different species, which flowers in autumn but does not produce its leaves till spring. LINNAEUS' C. montanum, being an autumn-flowering plant now usually excluded from the genus Colchicum, thus has no connexion with our Croatian plant or with that of the Botanical Magazine.

Examination of Linnaeus' herbarium by botanists of last century merely increased confusion by introducing a third plant. The specimen [illustrated by LACAITA in Journ. Linn. Soc. Bot. xlvii. p. 173 (1925), and Nuovo Giorn. Bot. Ital. nov. ser. xxxii, t. iv, fig. b (1925)], here representing C. montanum, bears no relation to the printed account and is possibly C. Catacuzenium, certainly not Merendera Bulbocodium nor C. alpinum. A note on the back of the sheet, where data were usually recorded in the older herbaria, says "Habitat in Morea," and thus indicates a Grecian origin for this third plant; J. G. BAKER in his revision of Colchicum † assumed, however, that Loefling had sent it to Linnaeus from Spain and interpreted it as the type of the species. At the same time BAKER increased confusion by "lumping" under C. montanum ("stirps valde variabilis"!) several distinct species, among them C. Bertolonii, C. pusillum, C. Ritchii, C. triphyllum, etc. Thus a number of different plants have been identified as C. montanum, and a range extending over the whole Mediterranean region has been attributed to this collective species.

In 1877 George Maw, the monographer of Crocus, collected on the Nymph Dagh mountain, east of Smyrna in Asia Minor, a number of bulbous plants, among them *Chionodoxa Luciliae*, and the small vernal Colchicum which Baker figured in the Botanical Magazine (t. 6443) as *C. montanum*. This belongs to Bieberstein's *C. bulbocodioides* (1808), but that name is no longer valid, having been applied earlier (1804) by Brotero to a different Portuguese plant. Accordingly, in 1906, Rouy ‡ gave the new name of *C. Biebersteinii* to Bieberstein's *C. bulbocodioides*, defining that species however rather broadly.

Like the *C. croaticum* of gardens *C. Biebersteinii* produces its leaves and flowers together in spring, as do sundry other small Colchicums. It has several times been introduced into cultivation, but nobody seems to have kept it alive for long: Dyke's Croatian plant has survived and multiplied without special care for over ten years. Comparison of *C. Biebersteinii* with *C. croaticum* reveals a number of small but significant botanical differences between them; using Janka's key § and Stefanoff's valuable monograph || of this difficult genus, it has

^{*} LAPEYROUSE, Hist. abrég. pl. Pyrénées, 202 (1813).
† "Synopsis of Colchicaceae and the aberrant tribes of Liliaceae," pp. 423-434,

in Journ. Linn. Soc. Bot., vol. xvii (1879).

‡ Rouy, G.: "Remarques sur quelques colchiques," in Bull. Soc. Bot.
France, vol. lii. pp. 641-646 (Jan. 1906).

§ Term. Fuz., vol. x (1886).

| STEFANOFF, Boris, "Monographie der Gattung Colchicum" [including Bulbocodium, Merendera and Synsiphon], in Sbornīk' na B'lgharsk. Akad. Nauk.,

been possible to identify C. croaticum beyond doubt with Janka's C. hungaricum. The older name stands. C. croaticum agrees with original and other specimens from the type-locality of C. hungaricum, as well as with the detailed description given by Neilreich,* on which the name is founded. SEYMANN showed in 1909 † that the species extends from south-east Hungary over Croatia and Dalmatia to Hercegovina. Visiani published a figure under the name C. montanum in 1826; as the following synonymy will show, it has been confounded under several species. These small Colchicums are closely allied, and it is largely a matter of taste and convenience whether they should be treated as distinct species or united in one as geographical varieties. The latter procedure would not affect the name of our plant, C. hungaricum having many years' priority over C. Biebersteinii, unless SEYMANN'S view of C. hungaricum as an eastern geographical race of C. Bertolonii be accepted. C. Bertolonii however is an autumn-flowering plant, and is best considered a distinct species. Since C. Biebersteinii and C. hungaricum have been so much confused, their synonymy and distinctive features are given below.

COLCHICUM BIEBERSTEINII Rouy.

C. bulbocodioides M. Bieberstein Fl. Taur. Cauc. i, 293 (1808) non Brotero (1804); Steven in Mem. Soc. Imp. Nat. Mosc. vii, 76, t. 16 (1829); Velenovsky Fl. Bulgar. 566, excl. syn. (1891).

C. montanum auct. non Linn, e.g., Baker in Bot. Mag. t. 6443, excl. syn. p.p. (1888).

(1879); Boissier Fl. Orient. v, 164 p.p. (1884). C. Biebersteinii Rouy in Bull. Soc. Bot. France lii, 644 p.p. (1906); Stefanoff Mon. Gattung Colchicum, 36 (1926).

ILLUSTRATIONS: Mem. Soc. Imp. Nat. Mosc. vii, t. 16 (1829); Bot. Mag. t.

6443.

Leaves several (3 to 5), usually glabrous or scabrid-margined. Flowers pink; perianth-segments with numerous (about II to 18) veins. Type-locality: Asia Minor, "in Tauriae" (Bieb. l.c.).

Distribution: south-west Russia, Bulgaria, Turkey and Asia Minor.

COLCHICUM HUNGARICUM Janka.

C. montanum auct. non Linn., e.g., Visiani Stirp. Dalmat. Specimen, 31, t. vi (1826); Ascherson and Graebner Syn. Fl. Mitteleurop. iii, 19, excl. syn. p.p. (1905); Bowles Handbook of Crocus and Colchicum, 177 p.p., t. 24 (1924);

Journ. Roy. Hort. Soc. liii, p. xliii (1928).

C. Bertolonii auct. non Steven, e.g., Reichenbach Icon. Fl. Germ. x, figs.

940-I (1848). C. bulbocodioides Janka in Oest. Bot. Zeitschr. xvii, 104 (1867); Neilreich Diagn. Ung. Gefasspfl. 126-7 (1867); non Bieberstein.

^{*} The name C. hungaricum was published in Janka's key to the Liliaceae of Europe, with a brief diagnosis and a reference to the fuller description (under C. bulbocodioides) in Neilreich's Diagnosen: "Bulbo tunicato bi—raro tri—folio uni-plurifloro, floribus basilaribus simul cum foliis prodeuntibus, perigonii limbo tubo multo breviore, laciniis lineari-oblongis 7-12nerviis, nervis stylisque rectis, foliis late lineari-lanceolatis acutis canaliculatis ciliatis recurvis. In graminosis montis Harsanyhegy prope Siklos Comit. Baranyensis (Janka). Februario, Martio. Stirps gracilis elegans, perigonium cum tubo 3-5" altum album vel limbus tinctu pallide violaceo variegatus, laciniae 23" latae, tubus filiformis debilis post anthesin cum limbo cernuus, antherae luteae, folia opaca 3-6" lata."
† See SEYMANN, VILMOS. "Die systematische Stellung von Colchicum hun-

C. hungaricum Janka in Mag. Növ. Lap. vi, 117 (1882) and in Term. Fuzetek, Budapest, x, 75 (1886); Prodan Fl. Romania, i, 183 (1923); Stefanoff Mon. Gattung Colchicum 39 (1926); Javorka Mag. Fl. Kepek (Icon. Fl. Hung.) iii, 74, fig. 623 (1929); Hayek and Markgraf Prod. Fl. Penins. Balcan. iii, 25, in Fedde Rep. Sp. Nov., Beihefte XXX, iii (1932) cum f. albifloro (K. Maly).

C. bulbocodioides Bieb. ssp. C. hungaricum (Janka) Nyman Consp. Fl. Europ.

Suppl. II, 310 (1889).

C. Biebersteinii Rouy in Bull. Soc. Bot. France, lii, 644 p.p. min. (1906) sed non C. bulbocodioides Bieb.

C. Bertolonii Steven ssp. hungaricum (Janka) Seymann in Magyar Bot. Lapok

viii, 63, 67 (1909).

C. croaticum hort. Dykes ex Gard. Chron. ser. 3, lxxxi, 120, fig. 62 (1927); P. Moore in Gard Chron. ser. 3, lxxxiii, 170 (1928).

C. montanum var. croaticum hort. Dykes ex Grove in Gard. Chron. ser. 3,

c. montanum val. troutitum nort. Bykes ex Grove in Gard. Chron. ser. 3, xci, 78, fig. 32 (1932).

ILLUSTRATIONS: Visiani Stirp. Dalmat. t. vi (as C. montanum); Reichenbach Icon. Fl. Germ. x, fig. 940-1 (as C. Bertolonii); Bowles Handb. Crocus, Colchicum t. 24 (as C. montanum); Gard. Chron. 3rd ser., lxxxi, fig. 62 (as C. croaticum), xci, fig. 32 (as C. montanum var. croaticum); Javorka Mag. Fl. Kepek, fig. 623 (as C. hungaricum).

Corm small, up to 3 cm. long, 2 cm. broad, with a smooth, fairly thin, brown tunic produced upwards into a short neck. Leaves appearing with the flowers, linear-lanceolate, usually 2 (less often 3), ciliated along the margin and sometimes on the slight dorsal keel with numerous fine hairs, channelled above, at flowering time about 3 to 6 cm. long, later becoming recurved, flatter and up to 20 cm. long, 2 cm. broad. Flowers 1-8, very pale pink or white (f. albiflorum); tube about 3 cm. long; perianth-segments with few (6 to 10) veins, bluntish, ellipticlanceolate or oblanceolate; shorter than the tube, about 2 to 2.5 cm. long; filaments subulate but swollen and yellow or green at base, about I cm. long; anthers purple, about 2.5 cm. long after dehiscence, with orange pollen; styles more or less straight, stigmatose only on the rounded tips, white, about as long as stamens. Capsule (nearly mature) glabrous, subglobose, trisulcate, about I cm. across, 8 mm. long; fruiting pedicels 2 cm. or less long.

Type-locality: south-west Hungary, comit. Baranya, "in graminosis montis Harsanyhegy prope Siklos" [45° 52 N., 18° 20 E.].

Distribution: Hungary, Romania, Istria, Dalmatia, Croatia and Hercegovina, Albania. In English gardens C. hungaricum usually flowers in January and February; in nature it varies from the end of December to April, apparently depending on local climatic conditions.

Both C. Biebersteinii and C. hungaricum belong to the section Eucolchicum A. Synanthae of Ascherson and Graebner and the subgenus Archicolchicum sect. Bulbocodiae of Stefanoff.

The above description of the Croatian C. hungaricum, introduced by William Rickatson Dykes in 1921, has been made from living material kindly supplied by the late E. KATHERINE DYKES and Mr. C. T. Musgrave, to whom I am also indebted for cultural information. C. hungaricum is so attractive and likely to be permanent in gardens that it is hoped the general adoption of its correct name will justify the trouble taken to ascertain it.

SUMMER FLOWERS ON MOUNT TROODOS, CYPRUS.

By H. E. WARR and C. E. GRESHAM.

THESE notes concern plants in flower in the months of June, July and August.

Mount Troodos—the highest mountain in Cyprus—is the home of many of the plants endemical to the island, and is really a massif, pine-clad to 5,800 feet, culminating in a flattened summit of 6,403 feet known as Olympus, or to the local inhabitants as Chionistra.

It is snow-clad from January to March, and from the top are seen with amazing clearness the Anatolian mountains of Asiatic Turkey.

Above the tree-line plant life is very scanty, the plants being mainly dwarf and alpine in character, contriving with quantities of *Berberis cretica*, *Sorbus Aria* subsp. *cretica*, and *Juniperus foetidissima* to endure the total absence of rain during the summer months.

Chionistra is a wild confusion of immense boulders of volcanic rock, with several plants of real merit, and brief descriptions of some of those seen may be of interest.

Alyssum troodi.—A 3-inch compact mat with large clear yellow flowers and foliage of the brightest silver. Endemical.

Anthemis tricolor var. artemisioides.—A beautiful prostrate plant 8 inches across, with furry silvery foliage. The flowers, produced in great abundance, were, however, over. Endemical.

Astragalus Echinus.—A 2-inch hedgehog with the fiercest spines covering a square foot or more, having tiny grey-green leaves and bluish flowers. The seeds are hard, embedded in the finest "cottonwool" and jealously guarded by the spines between which they nestle.

Hypericum confertum subsp. stenobotrys.—A delightful dwarf plant about 3 or 4 inches high, with tiny stemless linear leaves and yellow flowers. Endemical.

Hypericum modestum.—Even dwarfer than the foregoing, in fact almost prostrate. The tiny stemless leaves are obovate. Endemical.

Onosma troodi.—A really beautiful plant, some 4 inches high, with silvery furry foliage and clear sulphur-yellow tubular flowers. A gem, but very scarce.

Satureia troodi.—A 3-inch shrublet of considerable charm, with almost prostrate branches and tiny rounded leaves. The pleasing semi-tubular flowers turn shell-pink, and later mauve. A true rock plant, only found at the highest elevations. Endemical.

Sedum Lampusae.—Perhaps the most unusual Sedum extant, as it produces a conical flower-spike like Saxifraga longifolia, but with hundreds of bronze-yellow flowerets. Invariably found in crevices of

boulders, and usually on the sides of steep ravines. The plant forms a rosette of bluish green leathery leaves. Endemical. (Fig. 35.)

Teucrium cyprium.—A prostrate velvety mat resembling silvery moss, with tiny linear leaves and inconspicuous magenta flowers. Endemical.

Veronica ixodes.—A tiny 3-inch hairy blue-flowered plant, but, alas, only annual. Very scarce and only encountered on the summit. Endemical.

Some 600 feet below the summit the masses of rock give place to bare patches, heralding the approach of the tree-line. Hereabouts are seen other interesting plants, notably *Silene venosa*, a foot-high white-flowered species.

There are several flowering shrubs and plants of considerable charm, principally *Berberis cretica*, which fights its way to the summit of the mountain, *Paeonia corallina* with its seed-pods packed with seeds half purplish black, half brilliant coral-red, and *Styrax officinalis* with perfumed white flowers.

Once the tree-line is reached we come to the kingdom of the Pine, and these trees monopolize the upper slopes of the mountain. Naturally where pine needles carpet the slopes plant life is not abundant, but in open spaces, and especially in places where there is any sign of moisture, a number of delightful plants may be found. The best of these is undoubtedly Saponaria cypria (fig. 36), which is a neat 4-inch bush with very woody stems and large flowers of which three distinct colour forms were found, viz. bright rosy pink, bright magenta, and dark magenta. It is very free-flowering, with as many as forty flowers on one plant. Another interesting though very scarce plant is Dianthus quadrilobus with 8-inch stems bearing sparingly large flowers of a beautiful rosy pink.

Euphorbia herniariaefolia is a trailing plant with definite charm, which grows on rocks. It has a very stout woody rootstock from which radiate snake-like stems bearing greyish green leaves and yellow flowers. After flowering the foliage turns a brilliant red.

Shady ravines where there is moisture will be found to contain a number of pretty flowers, instances being Samolus Valerandi, Geranium Robertianum subsp. purpureum with clear blue flowers, Laurentia tenella, Anagallis arvensis and A. coerulea.

There are large quantities of bracken—Pteridium aquilinum—in the forest, as well as a number of very interesting plants, of which Limodorum abortivum—a violet orchid growing up to 3 feet—and Colchicum troodi—an endemical pale pink autumn-flowering species—deserve special mention.

Below the forest line the scrub or maquis belt begins, of which the outstanding plants are *Cistus* (notably *C. creticus*, *C. salvifolius*, and *C. villosus*) and *Putoria calabrica*. The latter is most attractive, and the reddish flowers are large and very freely produced: but young plants have a most unpleasant odour.

Below the scrub belt and down to sea-level everything is burnt



Fig. 34.—My. Troodos looking north. Village of Pedoulas in audule distance. $[Te/uee\ p,\ \gamma_2,$



Fig. 35.—Sedum Lampusae from Cyprus.



Fig. 36.—Saponaria cypria on Mt. Troodos.

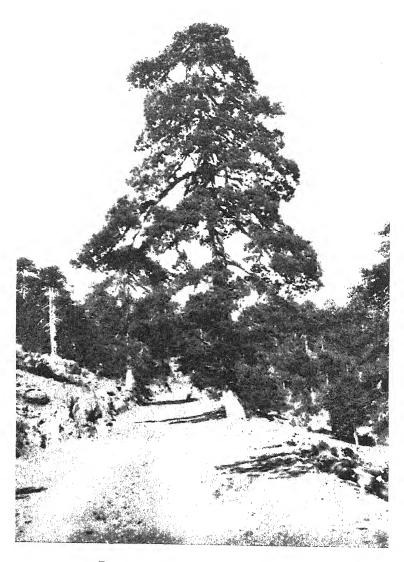


Fig. 37.—Pinus halepensis in Cyprus.

brown, and it is hard to believe that in springtime this area is ablaze with colour.

Rain ceases to fall after April, and the heat of the central plain becomes positively tropical. Mount Troodos is therefore the summer refuge of the Cyprus Government, the military garrison, and numbers of dwellers in Egypt for whom no nearer hill station exists. It is remarkably cheap, and hotels and summer camps, the latter being preferable, exist on all sides of Mount Troodos, usually at elevations of from 4,000 to 5,500 feet; Troodos being reached from Limassol—the nearest port—in two hours after a spectacular motor drive of 35 miles.

We were able to collect seeds of many of the more striking plants mentioned, and we have distributed them to Wisley and many other large gardens, so as to ensure their cultivation in Great Britain (see Appendix).

To Dr. Templeton and J. R. Shabetai Effendi of the Ministry of Agriculture, Cairo, are tendered our thanks for their invaluable assistance in identifying the plants enumerated in the notes and the Appendix.

APPENDIX.

List of plants of which seed was collected:

*Allium Willeanum *Alyssum troodi Anagallis arvensis Anagallis coerulea *Anthemis tricolor var. artemisioides *Arabis cypria *Arabis purpurea Asphodelus ramosus Astragalus Echinus Berberis cretica Centaurea cretica Cerastium fragillimum *Colchicum troodi Cynoglossum pictum Dianthus quadrilobus Epilobium angustifolium Euphorbia herniariaefolia Geranium Robertianum subsp. purpureum Hibiscus Trionum Hyacinthus romanus *Hypericum confertum subsp. stenobotrys

*Hypericum modestum

Limodorum abortivum Lithospermum incrassatum Malva sylvestris *Onosma troodi Paeonia corallina Paronychia macrosepala Pinus halepensis (fig. 37) Polygonum dumetorum Poterium Sanguisorba *Pterocephalus multiflorus Putoria calabrica Samolus Valerandi *Saponaria cypria (fig. 36) Saponaria Vaccaria *Satureia troodi Satureia vulgaris *Sedum Lampusae (fig. 35) Silene Galataea Silene venosa Stachys cretica *Teucrium cyprium Thlaspi violascens Trifolium procumbens *Veronica ixodes

^{*} Indicates plant is endemical to Cyprus.

SOME EXPERIMENTS IN ASPARAGUS CULTIVATION.

By A. N. Rawes.

The first of the experiments described below had its origin in American reports which had reached us of increased yields of Asparagus from male plants as compared with female. The difference in yield reported, something like 7 to 4, was confirmed by the appearance of the plants growing in the experimental grounds at the Agricultural Experiment Station, Davis, California, when Mr. Chittenden (then Director of Wisley) saw them in 1926. On his return the Council agreed to the starting of an experiment at Wisley to see whether, with British varieties and under the system of cultivation followed here, results of a similar nature would be obtained.

At the same time it was determined to plan an experiment which would tell which was the more economical method of planting—plants wide apart or plants close together. The present note gives an account of the first results of these experiments. A final reply to the question they are designed to answer must, of course, await some years' crop returns, but the indications in the first experiment amply confirm the American reports, and so far as those in the second go, they follow what we have learned to expect from experiments with other crops (see JOURNAL R.H.S., 41, pp. 88–93; 44, pp. 72–74).

It is a common observation that some plants of Asparagus bear a plentiful crop of berries and others bear none, while a few plants in a bed though almost fruitless yet now and again produce a few berries.

Examination of the flowers of the unfruitful plants shows both stamens and carpels, but the latter do not develop; the fruitful plants usually bear flowers in which the stamens though present are somewhat stunted, but occasionally they are fully developed as in the unfruitful plants. It is possible too that at times a change of sex may occur either completely or partially, and a plant hitherto unfruitful may produce few or many berries.

It is thus not easy to ensure that all the female berry-bearing plants are separated from the male unfruitful ones, but much can be done, and enough for practical purposes, by carefully examining the seedling plants during the second and third year of their growth and rejecting all that produce any berries, thereafter planting only those three-year old plants that have remained unfruitful.

We were fortunately able to interest Mr. S. Cundy, Nurseryman, of Sudbury, Suffolk, who grows Asparagus for planting, in our experiments, and he very kindly marked in his nursery beds plants of the variety 'Connover's Colossal' which bore berries, and these were in their third year lifted for planting in March, separately from the

unfruitful ones of the same stock, thus giving us two sets of plants of the same origin and age to plant.

These crowns were planted on ground thoroughly prepared, and almost without exception they made excellent growth.

The experimental beds were arranged in the Millands Field at Wisley, adjoining the Fruit Trial grounds at the north end of the Gardens. The soil there is a deep and light sandy loam over gravel, and, while well drained, is kept naturally moist by capillarity from the water stores below.

The site chosen had borne a crop of oats in 1930 and was prepared for the Asparagus during winter by bastard trenching. Deep cultivation proved necessary, for a hard pan had formed, after many years of shallow cultivation with the plough, which interfered both with free rooting and with the capillary rise of water. Farmyard manure was dug in during trenching at the rate of 30 tons to the acre. Care was taken before planting to clear the ground of all perennial weeds.

In March 1931 trenches 6 inches deep were made in which to plant, and particular care was taken to ensure that selected crowns were set singly and at the exact distances apart decided upon, and as described later in this report. Each crown was set on a slight mound in the trench, covered with top soil and the ground afterwards trodden down firmly.

A space of 6 feet was left between the beds to provide soil for casing the beds early in spring. The beds, at planting, were raised about 6 inches above the level of the alleyways.

As was expected a few of the male plants have produced berries from time to time, but the percentage has been very small, and quite insufficient to influence general conclusions. The berries have been early removed from these plants, in order to prevent the drain upon them that seed production entails, and which probably accounts in at least some measure for the lower production of shoots by the female plants.

It will no doubt be of some interest to detail the routine cultivation followed, since it has proved eminently satisfactory, and may be a guide to all who attempt to grow Asparagus on well-drained fairly moist soils of medium or sandy loam.

In October, or as soon as foliage begins to die down, the stems are cut off at ground level. The surface soil is forked and cleaned and care taken to remove all self-sown seedling plants. The surface is then raked down, a little being drawn off into the alleyways, and a dressing of farmyard manure applied, at roughly 30 to 40 tons to the acre. This is left on the surface all winter to decay. About the middle of March the surface is loosened and a light casing of soil thrown up from the alleyways. On to this artificial manures are applied, the dressing for all beds consisting of a mixture made up of 5 parts superphosphate of lime, 2 parts sulphate of potash, and 1 part sulphate of ammonia. This mixture is applied at the rate of 3 ounces to each square yard, or approximately 9 cwt. to the acre. In the first season after planting

a second light dressing of sulphate of ammonia was applied, during May, to strengthen growth; in subsequent years this second dressing has been omitted as unnecessary. Before growth begins in spring, during late March, the beds are cultivated with the hoe as necessary, to prevent the growth of weeds. No further cultivation is then practical until after the tops are removed in autumn. Under this routine treatment the plants have grown very strongly, and crowns have produced marketable stems of good grade and excellent quality.

I. CROPPING OF MALE AND FEMALE PLANTS.

In this series of beds 'Connover's Colossal' is the variety planted, and there are in all ten beds arranged as follows:

- Series A. Six beds, three of which contain male plants, alternated with three containing female plants. The plants in all these beds are set in four rows, with 3 feet between the rows and 2 feet between the plants, giving 64 plants to each bed.
- Series B. Two beds, one of male, one of female plants, set in three rows, the rows being 4 feet apart and the plants 2 feet apart in the rows, giving 48 plants to each bed.
- Series C. Two beds, one of male, one of female plants, set in two rows, the rows being 4 feet apart and the plants 3 feet apart in the rows, giving 33 plants to each bed.

Cutting on a small scale was done in 1932, and the crops tended in the same direction as in 1933, but they were small and need not be further mentioned.

In 1933 cutting began in the second week in April, but was stopped by frost between April 13 and April 24, and not until the last week in April were heavy cuttings made. Cutting ceased in the first week of June. The yields are shown below.

Series A.

The total number of saleable stems from the male plants was therefore 3,238, and from the equal number of female plants receiving precisely the same treatment 2,092—a figure greatly in favour of the male plants.

The stems as they were cut were graded roughly for size, but on the whole very little difference in the grades was noticeable. The male plants tended to give, compared with the total crop, a proportionately greater number of good stems in the early cuttings, but the difference in this first year of cutting is not sufficiently marked to enable any conclusion to be drawn (figs. 52, 53).

II. CROPPING OF CLOSE AND WIDE PLANTING.

The experiments to determine the effect of close and wide planting is being made with the variety 'Harwood's Giant.' The details of planting and cultivation are the same as those already described, but no attempt has been made to segregate male and female plants.

The arrangement of the beds and the results of the cropping in 1933 are as follows:

	Number of Plants in Bed.	Planting Distance.	Number of Stems cut.	Number from a Crown.	Average Number from Sq. Yard.
Bed 7 ,, 13 ,, 8 ,, 12 ,, 9	48 48 66 88 88	4' × 2' 3' × 1½' 2 double rows 1½' apart with 4' space. Plants 1½' apart in rows	397 489 528 469 558	8·3 10·2 8·0 7·1 6·3	8·3 10·2) 9·3 13·2 11·7 12·5 12·5
,, II ,, IO	88 132	2 treble rows 15" apart with 4' space. Plant 1½' apart	535 576	6·I 4·4	12·2) 11·1
,, 14 ,, 15	33 33	in rows 4' × 3' 3' × 3'	284 342	8·6 10·4	5·9 8·5

The highest average yield from a square yard of bed was, it will be seen, neither from the beds containing the highest number of plants nor from those where the spacing was widest; the lowest average yield of a crown was where the space was least, the highest where the space was considerable, but not where it was greatest. It is, however, too early to draw conclusions, but these first results suggest that there is an optimum distance for planting, and further crop-weights should prove of great interest.

THE HOT WATER TREATMENT OF NARCISSUS BULBS.

By N. K. Gould.

[Read January 24, 1933; G. W. LEAK, Esq., V.M.H., in the Chair.]

At the outset of this lecture on the hot water treatment of Narcissus bulbs, it may not be inappropriate to recall briefly the work of the late Mr. J. K. RAMSBOTTOM, by whom the process was initiated. RAMSBOTTOM was appointed in 1916 by the Council of the Royal Horticultural Society to investigate a disease of Narcissi which at that time was commonly thought to be due to a species of Fusarium. By means of a series of inoculations of healthy plants with a pure culture of eelworms which were prevalent in the tissues of diseased bulbs, RAMSBOTTOM satisfied himself that this species of eelworm, Anguillulina dipsaci (then known as Tylenchus devastatrix), was the real cause of the trouble. He found, moreover, that eelworms in the soil could invade healthy Narcissus plants not only through wounds but by penetration of the healthy outer tissues of the young leaves and flower-stalks. At the time of this investigation, the disease was becoming so serious a menace to the continued cultivation of Narcissi. that the discovery of some means of control was an urgent necessity. Among the possible methods of control which were considered were crop rotation, treatment of infected soil, trap-cropping and treatment of infected bulbs. While the first three of these methods, where applicable, may assist in checking the spread of the parasite, it is clear that neither will kill the eelworms within the bulb. RAMSBOTTOM sought, therefore, some way of treating the bulb between the times of lifting and replanting. Detailed reports of his work were published in the Journal of the Royal Horticultural Society and in other horticultural journals, and there one may read how he was forced to the conclusion that neither fumigation nor soaking the bulb in cold chemical solutions had the desired effect of killing the pest without damaging the bulb, while soaking the bulb in warm solutions held no advantage over soaking for similar periods in warm water. Experiments on hot water soaking had been carried out previously by Messrs. HEWITT and J. W. BARR, and continuing this line of research it was found that eelworms in the bulb could be destroyed without damage to the bulb itself by immersion for a period of three hours in water at a constant temperature of 110° F.

In spite of the fact that hot water treatment has been generally adopted by those who grow large numbers of Narcissi for pleasure or profit, the eelworm has by no means been exterminated. Bulbs which

have been subjected to the treatment are liable to become reinfected from contaminated soil, in which the pest is able to live in a condition of suspended activity for a considerable period, or from fresh stocks of bulbs with which it may have been introduced. Careful watch should be kept for signs of its reappearance among growing plants. The young shoots are attacked at an early stage, the parasite entering the developing leaves above the neck of the bulb. Close examination of such leaves when they are more fully grown reveals small, spongy areas of paler colour than the surrounding leaf-surface. In size and quantity the foliage may still be practically normal. Bulbs which were infected at the time of planting usually produce discoloured, twisted and dwarfed leaves which instead of standing erect show a tendency to curl away from the bulb (fig. 38). The flowers of such plants are commonly stunted and may open a week or more later than healthy ones in the same planting. Infected plants of common varieties ought to be removed as soon as the symptoms are recognized and burnt together with the soil surrounding them, lest they spread infection. Plants of valuable varieties may be lifted and laid in a dry place with a light covering of dry soil, to be treated as soon as the foliage has withered. This drastic treatment is sure to weaken the bulb, but it is unlikely to prove fatal.

Eelworms which have gained entry in the spring or early summer spread rapidly downward through the bases of the attacked leaves or flower-stalks. These parts of the plant, when they die back naturally, part cleanly from their bases at the neck of the bulb. The basal parts form bulb-scales which enwrap the growing parts in the centre of the bulb, and the blunt tips of these new scales form the apex of the bulb, and should be firm and solid. In eelworm-infected bulbs the tips of the inner scales are usually decayed and cause the neck of the bulb to be short and soft. The downward progress of the parasite is marked by light brown discoloration of the bulb-scales through which it passes. Infected bulbs cut transversely show characteristic annular areas of decaying tissue (fig. 39). The illustration of an infected bulb cut open in the autumn shows that the growing parts which would have provided the next season's leaves and flower, together with the few white scales in which they are enclosed, are not yet diseased; but it is highly probable that before flowering time they would have taken infection from the adjacent decayed parts.

The hot water treatment is not only effective in the control of eelworm, but will also destroy bulb-mites and the larvæ of the Narcissus Flies, which feed in the bulb. The development of lateral shoots will often enable a bulb damaged by these larvæ to recover after treatment (fig. 40). Some fungus diseases cause discoloration which may at first sight suggest eelworm invasion. The treatment does not cure diseases of this kind, and it may be responsible for conveying the resistant fungal spores from diseased bulbs to healthy ones. It is always advisable to sort the bulbs before treatment, removing any which are badly rotted. Recommendations have been made for the

use of formalin and other fungicides in conjunction with the hot water treatment, and experiments which it is hoped will determine the value of such modified treatment are in progress. The Fusarium disease which was formerly confused with eelworm damage is of frequent occurrence, especially among bulbs which have been stored at too high a temperature or with inadequate ventilation. It spreads rapidly in some varieties, reducing the bulb to a soft, chocolate-coloured mass. Another rot which is usually confined to the "basal plate" or stem of the bulb occurs chiefly in heavy and wet soils. Planting in light and well-drained soil is the best remedy. One other disease must be mentioned. That is the "Yellow Stripe" of Narcissi, an ailment which, although long known in British gardens, has of late spread with alarming rapidity. The symptoms are dwarfing with striped or mottled variegation of the foliage and distortion often accompanied by loss of colour in the flowers (fig. 41). It is thought that transmission of the disease from affected bulbs to healthy ones may occur in the hot water bath. Proof of this is still to be sought. At present no certain cure is known.

To obtain entirely satisfactory results from the hot water treatment it is necessary to observe certain precautions. The immersion of a living-and growing-bulb in water at a temperature far above that of the soil in which the plant normally grows might well be expected to influence its future development. In practice it often happens that the flowers and foliage produced in the season following treatment show some degree of modification. The leaves may be roughened and discoloured in streaks or patches on one or both surfaces (fig. 42). while damage to the flower takes the form of a narrowing of the perianth segments with frilling or gashing of the corona (fig. 43). Incomplete development of the stamens and carpels may occur in severe cases. The factors which are thought to operate in causing the effects described are incorrect temperature or duration of treatment, wrong handling of the bulb after lifting or before replanting, and treatment at an unsuitable date. The actual details of treatment can be controlled. Heating tanks, large or small, specially designed for the purpose, are obtainable from manufacturers of scientific apparatus. Experiments continued over long periods have proved that it is undesirable that treatment should take place immediately after lifting or that replanting should closely follow treatment. At the time of lifting, although the foliage of the current season may be completely withered, the roots are dislodged from the soil in which they were still actively growing, and in many varieties, notably those of the Poeticus section, root-development in undisturbed bulbs goes on throughout the summer. enforced cessation of root-growth which accompanies summer storage gives the bulb an outward appearance of dormancy which is quite at variance with the slow and continuous enlargement of the young leaves and flower-bud within. In order to trace the development of these growing parts within the bulb, three varieties, Emperor, Ornatus and Recurvus, were examined at fortnightly intervals for a year;



Fig. 38.—Symptoms of Eelworm infection in Narcissi.

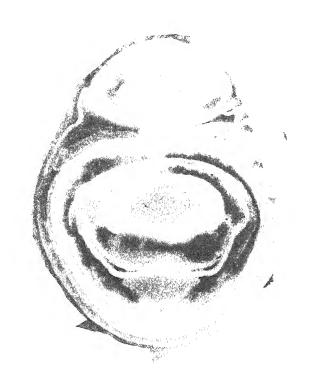


Fig. 39.—Symptoms of eelworm infection in Narcissus bulb.



Fig. 40.—Larva of large Narcissus fly in bulb of Narcissus 'Emperor.'



Fig. 41.—Yellow stripe in Narcissus 'Golden Spur.'

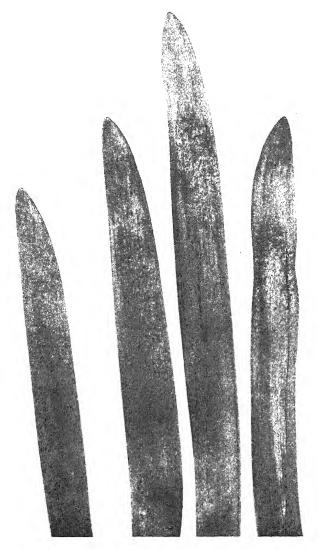


Fig. 42.—Leaves of Narcissus 'Emperor' damaged by the hot water treatment.



Fig. 43.—Narcissus 'Emperor,' showing on right flowers damaged by hot water treatment; on left, bulbs untreated.

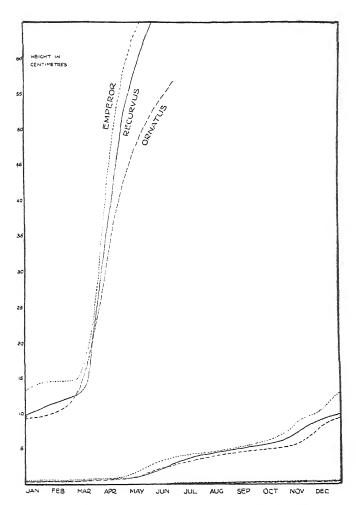


Fig. 44.—Curves showing rate of development during two years of growth cluster of three varieties of Narcissi.

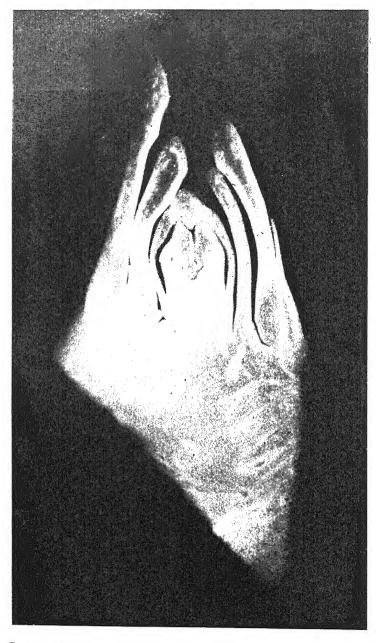


Fig. 45.—Section through growth cluster of Narcissus 'Emperor' bulb in June. \times 15.

particular attention being given to what may be termed the "growthcluster," consisting of a flower, from two to six or seven leaves (according to variety) and the two to four white scales which enwrap them in the earlier stages. Averages of exact measurements of six bulbs of each variety taken at each fortnightly examination were used in preparing the graph given at fig. 44. This shows that about twenty-two months elapse between the first appearance of the growth-cluster in June and the arrival of the flower at maturity. In a photomicrograph of a longitudinal section of the centre of a bulb of Emperor lifted at midsummer (fig. 45) can be seen the flower and portions of the leaves which would have reached maturity the following year; and at the base of the flower, on the left side, a small, rounded mass of tissue which would have formed the growth-cluster for the year after. The most important part of the curves in fig. 44, in their relation to hot water treatment, lies between June and October. The operations of lifting and storing cause the rate of growth to slacken and so to approximate to the desired dormant state. The date of lifting varies according to district and season, but most varieties will be ready at the end of June or earlier. There is nothing to be gained by leaving them in the ground after the leaves have died down, and July rains often give a fresh stimulus to root-growth besides increasing the difficulty of drving and cleaning the bulbs.

In experiments conducted at Wisley during the past three years bulbs have been lifted on several dates and stored before and after treatment for varying periods. Observations of their subsequent growth and flowering indicate the desirability of keeping the bulbs in a cool and well-ventilated store for at least two, preferably three, weeks before treatment and for a similar period afterwards. Sudden cooling by plunging into cold water or otherwise cannot be recommended.

The damage to flowers and foliage referred to above does not appear in the second season after treatment, but other less obvious effects may be observed. Some varieties treated at various dates in July grew taller in the second season than the untreated control rows, and the ratio of the number of their leaves to the number of flowers was found to have increased. This increase is due to the production of new lateral shoots and not to any increase in the number of leaves in the individual growth-cluster. This leads directly to more rapid splitting of the bulb, an advantage in varieties which are naturally slow to increase, but less desirable in those which normally develop offsets freely.

In this lecture it has only been possible to give a brief account of the nature of the eelworm disease and of some of the factors which influence the bulb in its response to the hot water treatment. Work is still in progress, both in this and other countries, which it is hoped will eventually dispose of the problems which yet await solution. Meanwhile, the increasing popularity and importance of the Daffodil is ensuring the continuance of efforts to facilitate its cultivation.

VOL. LIX. G

TRIALS OF HARDY FRUITS FOR COMMERCIAL PURPOSES.*

The following notes summarize the progress made in the Trials at Wisley and at the sub-stations for the year 1933. The season has been marked by variable results obtained with material under trial at Wisley and the sub-stations, due in the main to the severe frosts in spring and to the unusually dry summer. The effect of the spring frosts on the cropping of the different kinds of fruit is dealt with on p. 90.

Several new and promising varieties of different kinds of hardy fruits have been accepted for trial during the year: a few others which after extended test failed to justify recommendation or continued trial are eliminated. The acreage occupied by the trials at Wisley is the same as last year.

APPLES.

During the year, the most unfavourable for Apples experienced at Wisley over a period of twenty years, the variety 'Crawley Beauty' has behaved most satisfactorily. The late-opening blossoms escaped frost injury, and all trees have matured an excellent crop. A brief description of this variety was given in the JOURNAL R.H.S. 57, p. 269 (see fig. 50). As a late-flowering, long-keeping culinary Apple, 'Crawley Beauty' has much to commend it for commercial planting, particularly in those areas where spring frosts are of frequent occurrence. brightly striped apples are of even shape and attractive appearance, but when trees carry a full crop the average sample is a little below the size desirable in a market culinary Apple. This, of course, can be overcome by thinning. Its culinary qualities are good. The outstanding dessert Apple of this year has been the variety 'Lord Lambourne' (see Journal R.H.S. 57, p. 270 and figs. 48, 49). This is already becoming popular with growers as a dessert Apple to fill the gap between 'Worcester Pearmain' and 'Cox's Orange Pippin,' and its performance at Wisley during this unfavourable season should enhance its reputation. The trees have cropped well, and the sample of fruit obtained is entirely satisfactory-brightly coloured, of even size and good quality. Trees of 'Lord Lambourne' are planted at the substations, but as yet its suitability for growing in all districts is not wholly proved. Many more of the newer varieties carried light crops, but comment is withheld until a more favourable season.

Canadian Apple Seedlings Under Trial.

The several seedling Apples, received for trial from Canada and undergoing preliminary test at Wisley and the sub-stations, are giving

* For further details see R.H.S. JOURNAL, 57, p. 246, and 58, pp. 161 and 396.

interesting results, and it is hoped shortly to arrive at final conclusions as to their value for commercial planting in this country. Records so far available now cover several years, and suggest that few of the original ten seedlings are likely to suit our conditions. The variety 'Melba' is outstanding in some ways, and it has met with mixed receptions from judges and visitors to the trials. 'Melba' is a medium to large, greenish-yellow fruit, faintly flushed and striped with crimson, which ripens during August. Notable characters are the soft and very juicy flesh, sweet flavour and distinctive aroma. In the opinion of many, the poor travelling qualities, combined with a pale skin colour, are likely to detract seriously from its value as a commercial variety. That this view is not supported by all is evident from the fact that 'Melba' is already planted in a few orchards by growers who have had opportunity to judge of its value. In character of growth, cropping and quality, the variety may be considered satisfactory, and with the few good early-maturing Apples available, it may prove of value for special markets, but the fruits are too easily bruised and too pale to meet with general approval. Another of the Canadian seedlings to earn some favourable comment is 'Patricia.' The fruits are of medium size, sometimes rather small. bright red, and very juicy and sweet, ripening in August and early September. 'Lawfam' is another that may possess useful qualities, but with the possible exception of 'Melba' it is not anticipated that we shall find among the original batch of ten seedlings a variety to rival the best English varieties of similar type and season. A second series of ten Canadian seedlings is established at all stations, but trees have not yet reached good bearing age.

A notable feature of these Canadian Apples is that seven of the first ten seedlings received for trial have over several years proved markedly susceptible to scab disease. Our records show that 'Melba' may be less susceptible than most others, but at Wisley and certain of the sub-stations, the varieties 'Patricia,' 'Hume,' 'Joyce,' 'Lawfam,' 'Lobo,' 'Pedro,' and 'Stonetosh' have been heavily infected, compared with neighbouring trees of English varieties.

Susceptibility of Apples to Scab Disease.

In connexion with the susceptibility or resistance of varieties to scab disease, careful records have been kept for some years, and the following summary of observations made at Wisley may be of general interest. As records accumulate it is proposed to make this the subject of a further report. The varieties listed in the following tables are in the Deer's Farm Orchard at Wisley; all the trees reported upon are seven or more years old, and the grouping is based upon observations made during the last few years. It will be remembered that in the season of 1931 scab disease was fairly general among Apples in most parts of the country; in 1932 and 1933 infection was less severe. The observations include infection of foliage and fruit.

It should be explained that all varieties grown in the trial grounds and in the large collection adjoining receive a routine lime-sulphur spraying—i.e. two pre-blossom applications and one post-blossom, at usual commercial strengths. Exception is made only in the case of "sulphur-shy" varieties, such as 'Cox's Orange Pippin,' 'St. Cecilia,' and a few others, as will be explained in a later report.

These records, it is important to bear in mind, refer only to trees growing at Wisley. Observations on scab susceptibility may not correspond in all districts.

Varieties Free during Three Years.

Annie Elizabeth	Geo. Carpenter
Arthur Turner	Lane's Prince Albert
Beauty of Bath	Monarch
Bramley's Seedling	Ontario
Early Victoria	S. T. Wright
Edward VII	Sowman's Seedling

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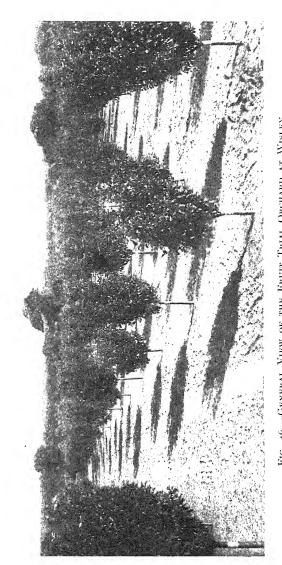
Varieties Slightly Infected during Three Years.

Laxton's Superb
Lord Derby
Lord Lambourne
Maidstone Favourite
Millicent
Peter Lock
Premier
Rev. W. Wilks
Rival
St. Cecilia
Thorpe's Peach
Victory
Wagener

Varieties Heavily Infected during Three Years.

Bushey Grove	Norfolk Challenger
Cellini	Opalescent
Devonshire Quarrenden	Red Coat Grieve
Exquisite	Tyler's Kernel
James Grieve	Worcester Pearmain

These lists include only a few well-known and new varieties: in addition to these, observations have been made upon trees of about 250 varieties, and over the same number of years the records would show a grouping of 35 varieties heavily infected with scab disease, 114 varieties only slightly infected, and 100 varieties free.



[To face p. 84. Fig. 46.—General View of the Fruit Trial Orchard at Wisley.

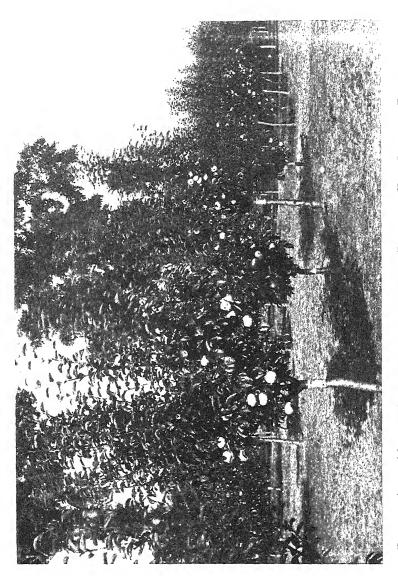


Fig. 47.—Apple 'Ontario,' showing arrangement of Bush and Half-Standard Trees in the Wisley Trial Orchard.

Apple Pollination.

It is proposed shortly to publish a separate Report embodying the results of investigations at Wisley to determine the self-fertility and self-sterility of new varieties of Apples undergoing trial. In the meantime, in response to numerous requests for information regarding the relative order of flowering of new varieties and others already being planted in orchards, the following list is given showing the order of flowering of certain varieties, based upon records of five seasons at Wisley. The variety 'George Neal' is normally the earliest to reach full blossom and is placed at the head of the list; 'Beauty of Bath' is in flower approximately $2\frac{1}{2}$ days later; 'Bramley's Seedling' will normally reach full flowering approximately $8\frac{1}{2}$ days after the earliest, and so on.

The average length of time over which a variety is in flower is about 18 days. It may be taken that the effective period of flower is 2 days before and 7 days after full bloom, and varieties having part of their effective flowering time within this period of 9 days would in any year overlap sufficiently to permit effective cross-pollination. For instance, in the list below, the flowering period of 'Beauty of Bath' would in any year overlap with that of 'King of the Pippins,' but 'Worcester Pearmain' might have only a few blossoms open when 'Beauty of Bath' was practically over. This overlapping of flowering periods is illustrated in Table 1, p. 93. A table illustrating the flowering period of most well-known varieties of Apples is given in the JOURNAL R.H.S. 37, p. 350, and 47, pp. 8, 15. Only a few standard well-known varieties are mentioned below for comparison with the newer ones.

George Neal .		Normally earlie	st				
Exquisite .		Approximately	3	days	after	George	Neal
Maidstone Favourite	e	,,	3	1,	,,	,,	,,
Red Coat Grieve		٠,	3	,,	٠,	,,	,,,
Beauty of Bath	٠	"	3	, 1	• • •	1)	,,
Wagener .		**	3	, ,	• • •	,,	, ,
Arthur Turner		,,,	3	,,	,,	.3.4	,,
Premier		,,	4	,,	,,	**	**
Brownlee's Russet		,,	4	,,	٠,	٠,	* 1
Alderman .		"	4	,,	,,	٠,	.,
Lane's Prince Albert	t	,,	4	,,	• •	,,	,,
Lord Lambourne		,,	4	,,	,,	,,	,,
Millicent .		3 •	4	,,	.,		,,
Peter Lock .		,,	4	7.1	*1	• •	,,
Bushey Grove		,,	4	,,	,,	,,	,,
James Grieve		,,	5	,,	31	,,	,,
John Standish		**	5	23	,,	,,	12
Excelsior .		7.5	6	,,	,,	12	,,
Joybells		,	6	,,	,,	,,	,,

A. W. Barnes .		Approximately	7	days	after	George	Neal
Ontario		,,	7	,,	,,	,,	,,
Rival		,,	8	,,	,,	,,	,,
Opalescent .		"	8	,,	,,	,,	,,
Cox's Orange Pippin		,,	8	,,	,,	,,	,,
Norfolk Challenger		,,	8	,,	,,	,,	,,
Bramley's Seedling		,,	8	,,	,,	,,	,,
Geo. Carpenter		,,,	8	,,	,,	,,	,,
St. Cecilia .		,,	8	,,	,,	,,	,,
Monarch .		,,	8	,,	,,	,,	,,
Victory		,,	8	,,	,,	,,	,,
St. Everard .		,,	8	,,	,,	,,	,,
John Waterer .		,,,	8	,,	,,	,,	,,
Mr. Prothero .		,,	9	,,	,,	,,	**
Sowman's Seedling		,,	9	,,	,,	,,	,,
Thorpe's Peach		,,	9	,,	,,	,,	,,
Laxton's Superb		,,	9	,,	,	,,	,,
Ellison's Orange		,,	9	,,	33	,,	,,
Rosemary Russet		,,	9	,,	,,	,,	,,
King of the Pippins		,,	9	,,	,,	,,	,,
Rosamund .			0	,,	,,	,,	,,
Cutler Grieve .		,, 1	0:	,,	,,	,,	,,
Beauty of Hants			0	,,	,,	,,	,,
William Crump			0	,,	1,	.,	,,
Herring's Pippin			0	,,	,,	,,	,,
Seabrook's Red			0	,,	,,	,,	,,
Coronation .		• •	0	,,	,,	,,	,,
Annie Elizabeth			I	,,	,,	,,	,,
Encore		**	Ι	,,	,,	,,	,,
Laxton's Pearmain			I	,,	,,	,,	,,
Eady's Magnum		**	I	,,	,,	,,	,,
King George V		**	Ι	,,	,,	,,	,,
S. T. Wright .			I	"	,,	,,	,,
Morley's Seedling		••	2	,,	"	,,	,,
Worcester Pearmain		,,	2	,,	,,	,,	"
Edward VII .		• • • • • • • • • • • • • • • • • • • •	3	,,	,,	,,	,,
Cottenham Seedling	•		4	,,			
Heusgen's Golden		,, –	8.	,,	,,	,,	,,
Reinette	:	,, r	5	,,			
Crawley Beauty		7	8		,,	,,	"
	-	,, 1	-	,,	,,	,,	,,

A further note regarding the behaviour of varieties of Apples is included in the later paragraphs dealing with frost damage at Wisley (p. 91).

SOFT FRUITS.

Soft fruits under trial generally cropped satisfactorily, with the exception of a few Black Currants and Gooseberries.

Strawberries.

In addition to the nine seedlings raised by Mr. M. B. CRANE, at John Innes Horticultural Institution and now planted in the trials, the variety 'Western Queen' is included, and others of the 'Huxley' type are planted for comparison with certain American varieties. It is proposed to include also about thirty seedlings raised by Mr. F. Boyes at the School of Agriculture, Cambridge.

In the previous report (Journal R.H.S. 58, p. 163) it was stated that the new variety 'Gaddesden' in its first year appeared similar in many respects to 'Royal Sovereign.' Following close observation upon plants during this season, however, it is considered that 'Gaddesden' is indistinguishable in growth and habit from 'Royal Sovereign.' The stock of 'Gaddesden' plants showed, at first, a slightly increased vigour compared with the established stocks of 'Royal Sovereign,' and 'Gaddesden' as seen now in the trial represents a better and healthier plant than the average commercial stock of 'Royal Sovereign.' Special attention is now being directed to synonymy among the varieties raised by Mr. ETTER of California, and alleged English varieties of the 'Huxley' and 'Brenda Gautrey' type; several stocks of these have been planted for the purpose. Apart from the excellent crops carried by the 'Gaddesden' plants and selected stocks of 'Royal Sovereign,' none of the new Strawberries is of such outstanding quality or performance as to warrant special note at this stage.

Raspberries.

The outstanding varieties remain 'Lloyd George,' 'Pyne's Royal,' and 'Red Cross.' 'Norfolk Giant' is the heaviest cropping, lateripening variety, and is regarded as suitable for canning and preserving, although in this very dry season much of the fruit did not finish well. Attempts to improve the stock of 'The Ellis' variety, so highly regarded for canning purposes, have so far not met with the success desired. The variety sent for trial under the name of 'The Reigate' is regarded as an excellent stock, but indistinguishable from 'Lloyd George.' It is said to have been raised from seed, and this is possibly supported by the fact that over a period of five years the stock has maintained good vigour and is comparatively free from disease, and as yet shows no signs of the degeneration so frequently seen in stocks of 'Lloyd George.' Plants of 'Lloyd George' of selected stock have been grown alongside 'The Reigate,' but growth and cropping have been inferior to that of the seedling; the two are not distinguishable however by any botanical character. The variety 'Preussen' has not justified its early promise in growth, cropping, or in the quality of fruit. 'Preussen' makes a very uneven plant-a few very strong canes here and there, and the large, coarse berries crumble when picked. Other varieties of continental origin growing at Wisley, while possibly superior to 'Preussen,' fall short of the standard set by the best English varieties. The new variety 'Matchless,' now undergoing test at the sub-stations, is earning favourable report. At the Wisbech, Merton, Durham, and Emneth stations, it has grown and cropped well, and better than most others planted at the same time. The firm, round, well-flavoured berries of 'Matchless' are of the type required for punnet work and canning. A further season of cropping is required before comparison can be made of other varieties growing at the different stations. A selection of the variety 'Brockett Hall' has maintained carly promise, having grown and cropped very heavily at Wisley. The original stock was mixed, but rogueing and selection have now provided a stock which will be distributed for extended trial in the near future. Several new varieties have been accepted for trial: three from the introducer of 'Lloyd George,' and others, mostly chance seedlings, from other sources.

Berries.

Several varieties of Blackberry are now well established in the trials, and interesting comparisons are being made. Two new varieties of outstanding performance this season are 'Bedford Giant' and 'John Innes.' 'Bedford Giant,' introduced by Messrs. LAXTON, is said to have been raised by crossing the Veitchberry with a common Blackberry. This is the earliest of the Blackberries in the trials to ripen its berries, and picking commenced this year during the third week in July. The plants have grown strongly, making stout canes, and cropping has been entirely satisfactory. The berries are large, round and deep shining black, and the quality is good. As an early Blackberry 'Bedford Giant' shows distinct promise. The variety 'John Innes' was raised in 1923 at the John Innes Horticultural Institution by crossing R. rusticanus inermis and R. thrysiger. It is a late-ripening variety and picking did not commence this season until nearly a month after 'Bedford Giant' had ripened. Moreover, 'Bedford Giant' carried ripe berries over a comparatively short season, whereas 'John Innes' continued to ripen berries in succession over many weeks. The growth of 'John Innes' is moderately vigorous, compared with such as 'Himalaya Giant,' but ample cane is made to provide a heavy crop. The berries are large, deep black and well flavoured, and as a late variety it is regarded as a valuable acquisition. Plants of 'Black Diamond 'are only recently established for comparison with 'Himalaya Giant,' and comment is withheld until a later report. 'Pollards' cropped very heavily, ripening a little before ' John Innes,' and while growth and cropping have been satisfactory, the quality, flavour and size of the berries is hardly up to the highest standard. The seedling raised at Long Ashton, 'W.D. 13,' has cropped well in some years, but on the whole does not compare favourably with others. 'Cotswold Giant' is another new variety recently planted in the trials. The 'Youngberry' plants have not thriven in the rather gravelly soil in which they were originally established, and fresh plantings will be made in conditions that will ensure a greater supply of moisture

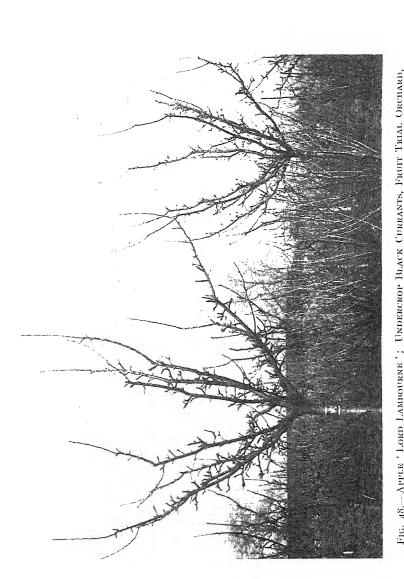
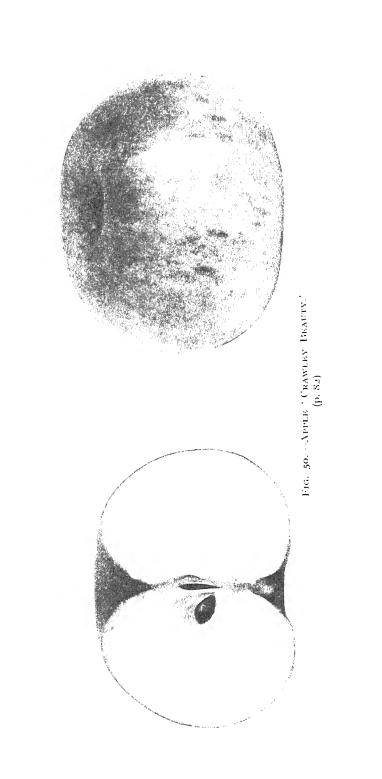


Fig. 48.--Apple 'Lord Lambourne'; Undercrop Black Currants, Fruit Trial Orchard, Wisley. (p. 82)

[To face p. 88.



Fig. 49.—Apple 'Lord Lambourne.' (p. 82)



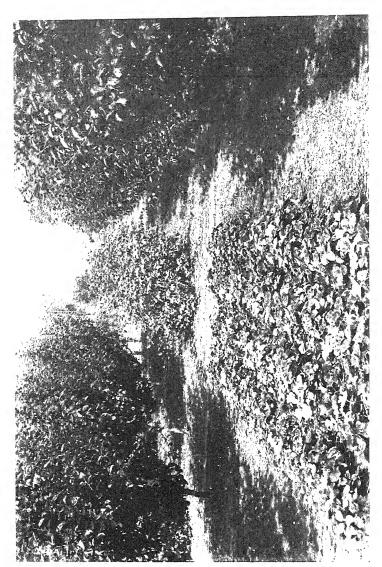


Fig. 51.—Strawberry and Raspberry Trials in Fruit Trial Orchard, Wisley. [To face ρ . 89.

during summer months. The stock of 'Newberry' received for trial has proved indistinguishable from the 'Phenomenal Berry.'

Little information is published regarding the season of the various Berries, and the following summary of records made on a few of the more mature plants in the trial grounds at Wisley may serve as some guide.

Red or Reddish Varieties:

King's Acre Berry	ripening	early	July
Youngberry	,,	,,	,,
Loganberry	,,	mid	,,
Hanway Berry	,,	,,	,,
Phenomenal Berry	,,	,,	,,
Newberry	,,	,,	,,
Mahdi Berry	,,	end	,,
Schaffer's Colossal	,,	,,	,,
Veitchberry	,,	"	,,

Black Varieties:

Bedford Giant	ripening	end Ju	ıly
Blueberry	,,	,, ,	,
Lowberry	,,	early A	August
W.D. 13	,,	,,	,,
Pollards	,,	mid	,,
Cotswold Giant	,,	,,	,,
John Innes	,,	mid-er	d August
Shirley Prolific	,,	early S	September
Cory's Thornless	,,	,,	,,
Burbank's Thornless	s ,,	end	,,

Records of 'Himalaya Giant' and others, in similar situations and conditions to the above, are not yet available.

Black Currants.

Little of value can be added to the previous report on Black Currants at Wisley and the sub-stations. During the year the French types have, on the whole, cropped more heavily than others, and of new varieties in this group, the varieties 'Martham Nulli Secundus' and 'Coulter Mains' have, at Wisley, behaved outstandingly well. Secundus,' however, appears to be a selection from 'French Black,' and shows no characters of marked distinction or improvement upon such as 'Seabrook's Black,' and the stock of 'Coulter Mains' is mixed. In the 'Baldwin' group 'Wallace Seedling' and 'Supreme' have maintained the early promise previously reported, and 'Westwick Choice,' while making a better bush than is usually associated with 'Baldwin,' has not produced heavier crops than the type. The variety 'Matchless' has cropped well at Durham and Merton and at the Emneth Station, and may prove superior to others of similar type. 'Martham Sunrise' is considered to be a selection of 'Boskoop Giant' and shows no marked improvement upon the older variety. The 'Westwick C' seedling has been established at the sub-stations for some years, and has in all districts made a good bush and cropped satisfactorily, and the ripe berries hang well. The rather drooping habit of low branches and the moderate bunches, however, do not recommend the variety as of outstanding value for commercial planting. The variety 'Davison's Eight' has not generally confirmed the early promise shown.

Red Currants.

Among the several varieties undergoing trial, 'Laxton's No. 1' remains outstandingly the best, and is to be recommended for planting in all districts. 'Earliest of Fourlands' is also good, but has in no instance—at Wisley or the sub-stations—rivalled the cropping capacity of 'Laxton's No. 1.' This variety was considered promising largely owing to its earliness, but this character does not appear to be sufficiently marked to justify unreserved recommendation. No other new varieties as yet warrant special note.

Gooseberries.

The new varieties 'Bedford Yellow' and 'Green Gem' have attracted considerable attention at the sub-stations, and further trial may show they possess qualities worthy of recommendation. Any further note upon new varieties of Gooseberry, other than the remarks included in the following note on frost damage, would be premature.

Nuts.

Nuts have cropped heavily at Wisley during the year, about thirty unverified varieties of Cobs and Filberts, mostly obtained from the Continent, having fruited heavily. So far Kentish Cob bushes have carried the largest quantity of good quality nuts, but bushes of other varieties are as yet too young to provide reliable records.

Canning Tests.

As in former years fruits of several varieties of different kinds of soft fruits, as Strawberries, Blackberries, Raspberries, and Gooseberries, grown at Wisley, have been sent to the Fruit Preservation Research Station, Campden, to test their canning qualities.

EFFECTS OF SPRING FROSTS ON CROPPING AT WISLEY.

The blossoming of all the "top" fruits undergoing trial coincided with a period of severe frost, with the result that Apples, Pears, and Plums suffered damage far greater than is recorded in any previous year. The blossom of various soft fruits did not suffer so severely as was at first feared, and on the whole cropping was satisfactory, with the exception of certain of the Gooseberries and the 'Baldwin' Black Currants. The first-opening blossoms on the Strawberries were killed,

but later flowers escaped injury, and crops generally were very good. This is the first occasion that serious frost injury to Apple foliage has been observed at Wisley, and on some varieties (generally those sprayed with lime-sulphur immediately before frost) the unfolding leaves were all killed.

The maximum frost recorded was 18° F. on the night of April 19, and over a period of twelve days (April 13 to 23, inclusive) frost was recorded at the Meteorological Station. It should be noted that the trial orchards are approximately 50 ft. lower than the Meteorological Station, and it is highly probable that the temperatures in the trial grounds were lower than those recorded at the Station.

The accompanying chart (p. 92) illustrates the maximum and minimum daily temperatures preceding and during blossoming of the different kinds of fruit.

Apples.

With Apples generally the frost damage was so severe as to preclude any reliable comparison of the resistance or susceptibility of varieties. Almost all suffered considerable damage, excepting only those few which did not reach the advanced "green bud" stage until the period of severe frost was over. Nevertheless, certain varieties flowering early or in mid-season matured fruit from later-opening blossoms.

In Table I, p. 93, is shown the period of severe weather, from April I3 to 23, which coincided with the flowering of early and midseasoning blossoming varieties. It should be emphasized, however, that the period of flowering of varieties, as tabulated in records obtained over a period of years, was in many instances upset by the abnormal weather conditions this season. It was observed that the high day temperatures of early April hastened the development of blossom buds generally, and several varieties had commenced to open before the severe weather set in.

In the Table (p. 93) varieties are arranged in their order of blossoming for this season. The horizontal lines show the number of days the variety was in blossom and the shaded area the period of most severe frost.

It should be noted that with early-flowering varieties the open blossom and unfolding buds were killed, and that the length of the flowering period shown in the table represents the period over which petals continued to open, even through essential organs were injured. With the mid-season flowering varieties, a large proportion of the unopened blossom was killed; and with those flowering late, a proportion of the flower buds were killed well before the "pink bud" stage was reached.

In varieties that flowered early, open blossoms along with those in "pink bud" stage were killed outright, so that it appeared there could be no prospect of fruit-setting. Certain of them, however, notably 'Lord Lambourne,' matured a good crop, for within a fortnight of the

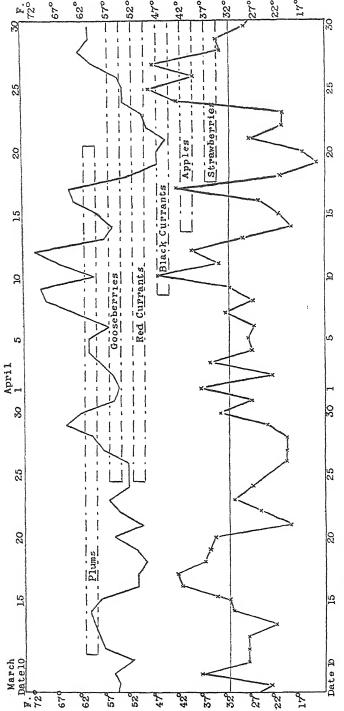


CHART SHOWING MAXIMUM AND MINIMUM TEMPERATURES AT WISLEY DURING THE FLOWERING OF HARDY FRUITS IN 1933.

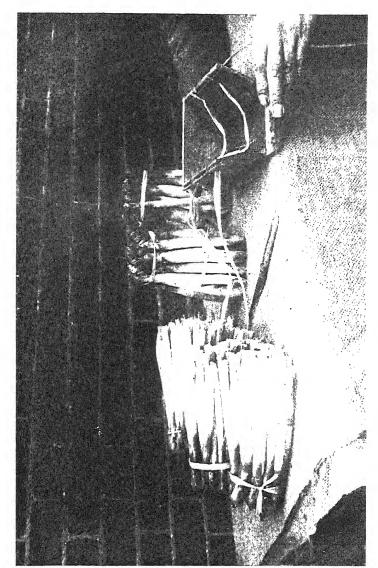


FIG. 52.---ASPARAGUS. CRADLE FOR BUNDLING. (p. 77)

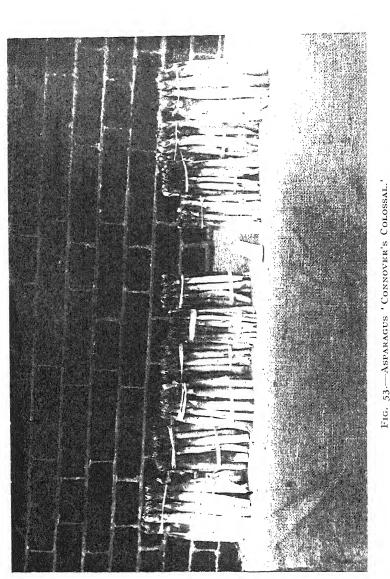


Fig. 53.—Asparagus 'Connover's Colossal.' Six bunches from male plants. Four bunches from female plants. (n. 77) $[To\,face\,\rlap/\,p.\,93.$

severe frosts killing the spur blossom, a considerable amount of blossom was produced on stout young shoots, invariably on the "leaders" of

Crop. 30 George Neal Nil 2 min. Maidstone Favourite Nil Wagener 3 Fair 4 Beauty of Eath 111111 Nil James Grieve 5 5 Light 5 Lord Lambourne Good 7 Nil Good Peter Lock Red Coat Grieve 8 Nil Arthur Turner 9 9 A.W. Barnes 10 Light 10 Light Bramley's Seedling 11 Nil 12 Brownlee's Russet 12 13 Nil Geo. Carpenter Lame's Prince Albert 14 Light 14 N11 Millicent 15 15 16 Ontario 16 Fair Ellison's Orange 17 Good King of the Pippins 18 Light 18 19 Early Victoria Cox's Orange Pippin 19 Light 20 Fair 21 Annie Elizabeth 21 Good 22 23 24 Cutler Grieve Good 22 axton's Superb 23 Nil 24 Nil Honarch 25 26 25 Light Opalescent St. Cecilia 26 27 Fair 27 Morcester Pearmain N11 28 28 Light Herring's Pippin 29 29 Good Cottenham Seedling 30 Edward VII 30 Good Fair 31 Heusgen's Golden Reinette 51 Crawley Beauty Heavy

TABLE 1.—Apple flowering and frost incidence, 1933.

the previous year's growth. The variety 'Lord Lambourne' was outstanding in this way. Other varieties to mature good crops from blossoms on "leader" shoots were 'Red Coat Grieve,' Ontario,' Wagener,' Cutler Grieve,' Ellison's Orange,' and 'Annie Elizabeth.' The fruits produced from these late-opening blossoms on young wood were in every case of normal development, and not to be confused with the abnormal shaped seedless "summer fruits" usually associated with late blossom.

The late-flowering varieties, 'Crawley Beauty,' 'Edward VII,' 'Cottenham Seedling,' and 'Heusgen's Golden Reinette,' did not open blossoms until the period of most severe frost had passed, but in a few instances the more advanced "green buds," usually the centre bud of a cluster, were killed. These varieties all matured crops.

Plums.

Plums commenced to blossom when conditions were favourable. A long spell of mild weather preceded the opening of the earliest varieties—i.e. 'Utility' and 'Grand Duke'—and so hastened the development of others that a comparatively short period of blossoming for all seemed probable. Cold weather with wind was experienced for about ten days, March 2I to 30, which injured blossoms already

opened and retarded the advancement of others. Consequently, the opening of blossom was delayed on some varieties by a week or more, bud development remaining almost stationary. The severe frosts recorded from April 13 to 23 did great damage to all, and coincided with the period of full blossom of late varieties. The one variety to crop satisfactorily was 'Czar,' and it appears this variety possesses some degree of frost resistance, since it reached full flowering two or three days before the most severe weather. It may be noted the trees of this variety are in no way more favourably situated than others: the trees are rather more open in growth than many, and the young foliage appears to offer even less protection to opening flowers than in some other varieties. Other varieties to set and mature a crop were 'Gisborne's' (regarded as one of the most regular croppers in any season, at Wisley), 'President,' and the 'Merryweather Damson.' Table 2 shows the period of blossoming of a few prominent varieties during 1933: the shaded areas show the days on which severe frost was recorded.

arch Auril Crop. Grand Duke Nil Nil Utility Monarch Nil Early Rivers Nil Early Laxton Nil Czar Heavy Merryweather Light Victoria Nil President Fair Pershore Nil Nil Belle de Louvain Gisborne's Fair

TABLE 2.—Plum flowering and frost incidence, 1933.

Black Currants.

Several varieties carried heavy crops, but the majority cropped below average. Nearly a fortnight of warm weather with gradually increasing day temperatures hastened the opening of blossoms. Flowering commenced on April 8 with the opening of the 'Baldwin' type, and by the 14th all others had blossoms opened. The severe weather, commencing on April 13 and followed by frost on eleven out of twelve nights, injured much of the blossom. Unopened buds mostly escaped injury, for in the milder conditions following blossoms continued to expand over an unusually long period. All varieties were

damaged to some extent. Those of the 'Baldwin' type suffered most severely: exceptions were 'Daniel's September,' 'Wallace Seedling,' and 'Supreme,' and it is recorded in previous years that these varieties have matured good crops when 'Baldwin' has failed. Varieties classed in 'Boskoop Giant' group carried lighter crops than usual, and those grouped with 'Victoria' were below average. The heaviest crops were carried by varieties classed in the 'French' group, as 'Seabrook's Black,' 'Nulli Secundus,' and 'Coulter Mains.' Table 3 illustrates the blossoming of a few varieties and the period of frost.

April Crop Seabrook's Black Good Lee's Prolific Good Resister Good Nulli Secundus Good Coulter Mains Good Victoria Moderate Goliath Moderate Boskoop Giant Fair Sunrise Fair Baldwin Very light Hilltop Baldwin Very light Daniel's September Good Supreme baca Florence Very light Wallace Seedling Good

TABLE 3.—Black Currant flowering and frost incidence, 1933.

Red Currants.

The Red Currants on the whole cropped satisfactorily, and the accompanying Table 4, listing only a few representative varieties, shows that those to carry light crops were the earliest to flower.

	March	April				Ma	F			
	27	1 5	20 25	20	- 25	30	5	20	15	Crop
'ay's Prolific		1	(//,	/////						light
Red Versailles		1		/////	3					light
Laxton's No.1.]	///		<u> </u>					very heav
Bridgeford Red		—	///	/////	4					good
Earliest of Fourlands		j	(11)		3 -					good
Houghton Castle		,	111		2					heavy
La Constante		3	· ///		4					heavy
Raby Castle			· 1//	11/11	?					heavy
Wilson's Long Bunch		1	- 111	11/1/	<u> </u>					heavy

TABLE 4.—Red Currant flowering and frost incidence, 1933.

The variety 'Laxton's No. 1' cropped most heavily, and was in flower approximately 35 days. All varieties were in flower during the most severe weather, and while none of the earliest matured a normal crop, later varieties and those with a long flowering period cropped well, crops averaging from 10 lb. to 12 lb. a bush with different varieties.

Gooseberries.

Of the new varieties under trial, 'Green Gem' was the only one to crop heavily, and of the standard varieties, 'Cousen's Seedling' and 'Careless' fruited well. It is shown in Table 5 that these three varieties provided a longer succession of blossoms than did others. With 'Cousen's Seedling,' and to a smaller extent with the other two varieties, the advanced foliage undoubtedly protected a great deal of the unfolding blossoms. 'Green Gem' was in blossom approximately 37 days.

TABLE 5.—Gooseberry flowering and frost incidence, 1933.

	March 25	April	70 15	20	25	30	ay 5	70	Crop
Berry's Early Kent	1/////		111			er.Clas			light
Cousen's Seedling			1//			-			heavy
Leveller			9//		3				very light
Green Gem			///		4_	-			heavy
Careless				/////	1			l	fairly heavy
Lancer		-	1//		4				light

Despite the unfavourable season for "top" fruits at Wisley, the number of visitors to the trial grounds shows considerable increase over the previous year, and a similar increase in visitors and in the general interest taken in the trials is reported from all sub-stations.

FIG. 54.—The View from the House, Sheffleld Park.

[To face p. 96.

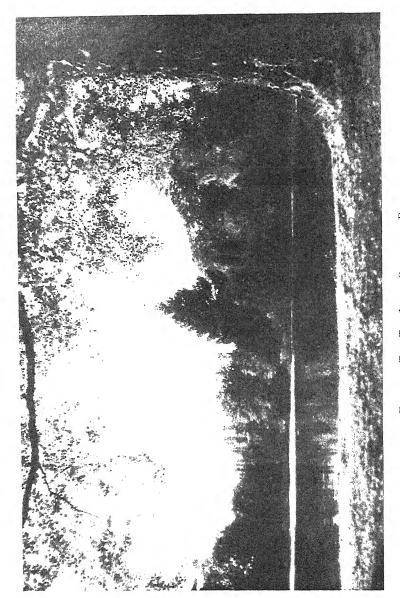


FIG. 55.—ТИЕ ТОР LAKE, SHEFFIELD PARK.

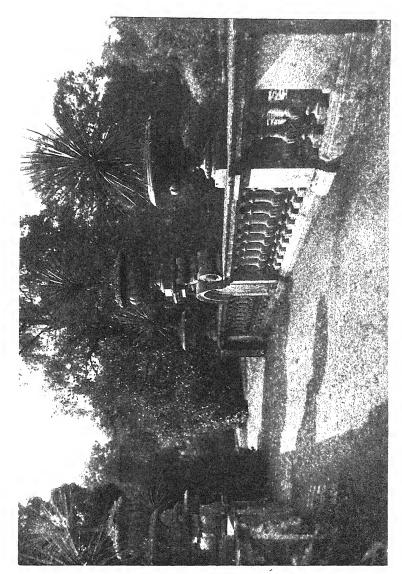


FIG. 56.—Тив Вкюсе оуек тие Waterfall, Sheffield Park.

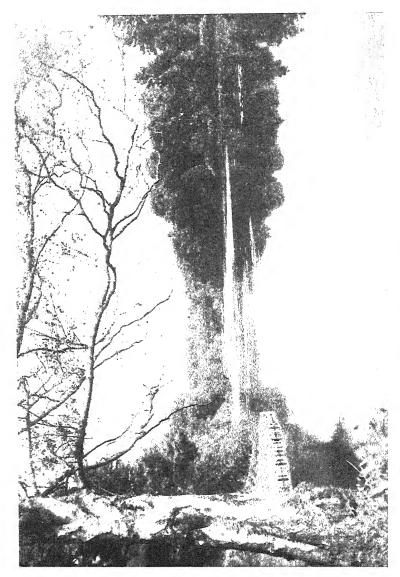


Fig. 57.—The Third Lake, Sheffield Park.

AUTUMN COLOURS AT SHEFFIELD PARK, SUSSEX.

By ARTHUR G. SOAMES.

SHEFFIELD PARK is on the main road from East Grinstead to Lewes and some little distance west of Uckfield. The plan on p. 99 shows part of the grounds, and by its aid the reader will be able to follow the imaginary walk which we would like him to take with us from the house first down by the north side of the two top lakes (we call our bits of water "lakes" in Sussex), though on that side Rhododendrons predominate with but little planting for autumn colour, to see which is the main object of our walk.

Notice first Parthenocissus Henryana (Vitis Henryana), which covers a considerable portion of the east side of the house, and is extremely beautiful for about a fortnight in October. It appears to revel in a coolish aspect. Then beside the lawn there is a fairly large bush of Euonymus alatus, which ought, so far as is possible, to be kept apart from the rest of the Autumn Reds, as it rather swears with them.

Approaching the head of the top lake (fig. 55) we come to a fine Scarlet Oak (Quercus coccinea splendens), one or two trees of Amelanchier, which are good in flower and beautiful in their October garb, a few Nyssas, some Japanese Maples, and by the water's edge some Deciduous Cypresses (Taxodium distichum) and Berberis Thunbergii. We then come to the south garden, a very sheltered spot which is the home for a longer or shorter time of various risky things, and then to the ground between the Rhododendron wood and the second lake, where are so many big trees and Conifers that it is more suitable for the hardy hybrid Rhododendrons and Azaleas than for autumn colour. But there are a few Japanese Maples, as these seem to colour as well in half shade as in full sun.

We cross the bridge (fig. 56), which is over the outfall from the second to the third lake, and here we get the view of the cricket ground bank on the opposite side of the third lake. The picture of the third lake (fig. 57) just shows on the right the extreme end of the bank, and the bare ground on the left foreground of that picture is where a clearance of big things has just been made to give additional views of the opposite bank. On this bank neither the Rhododendrons nor the autumn-coloured trees have it all their own way, and it is a near thing whether the bank is the more effective in early June or in late October.

On the edge of the water are Liquidambar, Deciduous Cypress, a few Amelanchiers, and clumps of *Berberis Thunbergii*. The Liquidambars, with their toes in water, colour better here than in a drier position, and usually they keep their colour till December. Higher up is a tree or two of *Acer Ginnala*, which is generally the first to show colour. There are clumps of *Photinia variabilis*, which when in colour is most brilliant,

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and several bush as well as tree Amelanchiers—a few Scarlet Oaks (Q. coccinea splendens), some Japanese Maples and Nyssas, and clumps of Berberis Thunbergii here and there. Besides these there are a few Conifers and Silver Birch, and many Rhododendrons, but there is colour enough to make a very bright picture in the latter half of October.

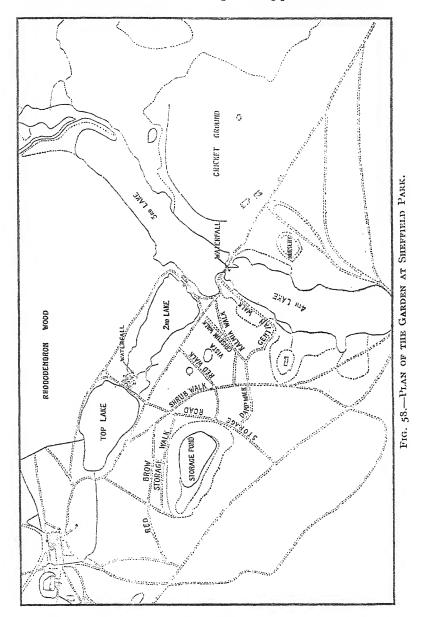
We then cross a little bridge, which spans a waterfall from the third to the fourth lakes, and leads to a dell from which the photograph, called "A glimpse of the fourth lake" (fig. 59), was taken. The Dell leads upwards to what is called the East Park, and it is here that visitors' cars are parked on our public days; but we should like to add that every day between early May and mid-November our garden is open to visitors, though at a slightly higher charge (in aid of the County Hospital and the Nursing Fund) than on the advertised days.

Returning from the Dell and recrossing the bridge, we take a grass path to our left, which we call the Gentian Walk. This path skirts the fourth lake, and upon the opposite bank the view, "A corner of the fourth lake" (fig. 60), is seen across the water. There are Vaccinium corymbosum and V. pennsylvanicum, one or two Japanese Maples, and Nyssas, and a big patch of Berberis Thunbergii. With the bracken on the steep bank above, and the Oaks and the bracken in the background, this makes one of the most pleasing pictures in the garden. Continuing along our path, a thin wood of Silver Birch is on our right and several Nyssas in the bracken beyond the Birches make very bright streaks of colour. We might say here that nearly all the paths we shall traverse now are in wild ground—a few stretches of heather but mostly bracken, and that nearly all the bracken ground is covered in May with Bluebells and Cowslips.

The path turns to the right when it reaches the wood, and then we see in addition to the Nyssas, of which we had glimpses between the stems of the Silver Birch, several Scarlet Oaks, Amelanchiers, Photinias, etc. Now we come to the long, winding beds of *Gentiana sino-ornata* on either side of our grass path. The Gentians were still good—I might almost say very good—at the beginning of the second week in November, 1933, and backed on either side by fruiting Berberis with their pendent clusters of coral berries, with a particularly good red-brown Deciduous Cypress behind, and close by a tall graceful Silver Birch, with its golden foliage against the blue sky, they made an extremely pretty picture for so late in the year. But early that week the days were absolutely still, with an almost cloudless blue sky, and all gardeners know what a difference this makes at any time, but more particularly in late autumn.

We now come to the Kalmia Walk, where are Prunus Sargentii, Berberis virescens, and B. Thunbergii, Sorbus discolor, S. Vilmorinii, Liquidambar, Pistachia, besides Scarlet Oaks, Nyssas, and other autumn-coloured things that have already been mentioned.

We call it the Kalmia Walk as there are Kalmias on either side for the greater portion of it. Some twenty-five years ago I used to visit the Knap Hill Nursery each year when their Kalmias were in bloom, and I was allowed to select the most promising pink varieties. I then



started to raise seedlings by crossing the best of these with each other, and later Professor Sargent was good enough to send me a small plant of their best pink form at the Arnold Arboretum.

It proved to be no better than my best, but it gave me fresh blood, and perhaps improved my strain. The pick of my seedlings are now in

the garden, and they certainly are much pinker than the Kalmias one usually sees. Kalmias, where they thrive, are extremely desirable plants in a garden, as the best are very attractive, and they bloom when most of the Rhododendrons and the greater number of the flowering shrubs are over.

A few yards up the main path from where the Kalmia Walk ends we come to the Griseum Walk, so named because a tree of Acer griseum stands at the end of this path, which runs more or less parallel with what we call the vista. There is a nice plant of Euonymus aldenhamensis, which the late Mr. VICARY GIBBS gave me several years ago, and further on a beautiful little tree of Sorbus Vilmorinii, which attracts much attention when loaded with hundreds of coral berries. There are also some Euonymus alatus, a big Prunus Sargentii, Nyssas, Japanese Maples, etc.

The "vista" is so called because after a level hundred vards or so from the path the ground dips, to rise again in the far distance up to a fine clump of trees in the Park.

The level portion of the ground was clothed for a good many years with Erica cinerea coccinea, which used to make a brilliant mass of colour about the end of June, but in the case of Heaths that have to be raised from cuttings their life is comparatively short, and as it was going back year by year we replaced it in 1932 with Vaccinium corymbosum, of which we had raised considerable quantities from layers. One could wish for this particular job that it had the same lowly stature as the Ericas, but when established it should make a fine mass of colour in late October.

Higher up we enter, from the main path, what we call the Red Walk, which is so named because everything that is growing there turns red in autumn. At the right time and on the right sort of day it can be a striking and unusual sight.

Here are Photinias, Scarlet Oaks, Amelanchiers, Japanese Maples, Nyssas, Sorbus discolor, Oxydendron arboreum, etc., amongst the taller things; Disanthus, Enkianthus campanulatus, Euonymus alatus, Cornus florida, C. rubra, Euonymus aldenhamensis and E. 'Brilliant,' Berberis virescens, Stephanandra flexuosa, etc., amongst the plants of lesser height; and Berberis Thunbergii, all the Gaylussacias, Vaccinium corymbosum and V. pennsylvanicum, Enkianthus japonicus, Fothergilla, etc., nearest the path. Nearly all these are repeated many times over, and the best show is when the Photinias are blazing, as there are more of them than of anything else.

There are a good many Osakazuki Maples also, which when at their best are perhaps even more brilliant than the Photinias, but the Photinias never seem to fail us, and it is by no means every year that the Osakazukis give the colours of which, in a favourable season, they are capable.

The Red Walk crosses what we call the Shrub Walk, where Conifers chiefly are planted, but at the lower end there are some tall Osakazukis on either side, and these coloured pretty well last year—far better than

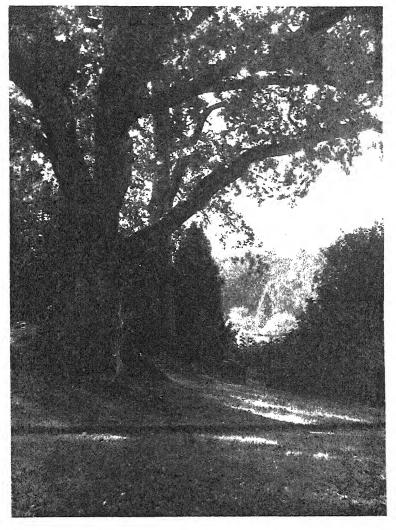


Fig. 59.--A GLIMPSE OF THE FOURTH LAKE, SHEFFIELD PARK.

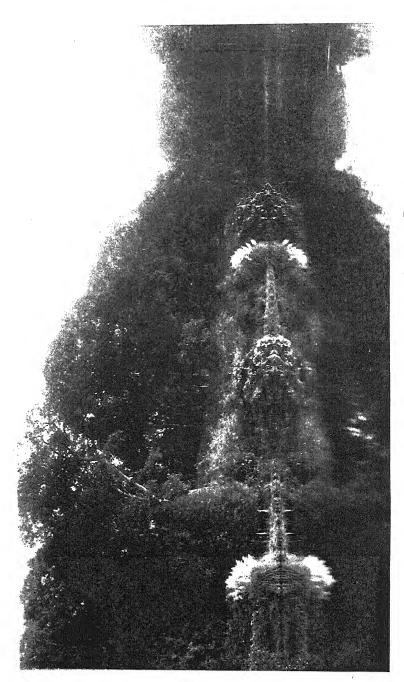


Fig. 60.—A Corner of the Fourth Lake, Sheffield Park.

those in the Red Walk, which failed to do themselves justice, and this was somewhat unaccountable, as they were separated only by a very few yards.

Passing between these Osakazukis we come to what we call the Damp Walk, which earned its name by an occasional leak in the Storage Pond, which is on higher ground close by. Here are a good many autumn-colouring things, and amongst them a Red Oak (Quercus rubra) and a few Berberis Thunbergii atropurpurea, which were a very deep rich red in November. We have not seen it so good before.

We pass a small copse of Silver Birch, where in spring there are masses of Primroses, Lent Lilies, and Bluebells, and we join the Storage Road which leads on through an expanse of bracken to the road through the Park.

There are some fine *Pinus radiata* here, but being rather low-lying ground it is chiefly planted with things that grow in swamp or in very damp ground in their own country, such as Deciduous Cypress, *Quercus palustris*, Liquidambar and Nyssa.

We have not been able to notice that such things grow any less well in the drier than in the damper parts of the garden. Some of our largest Deciduous Cypresses—and all were planted at the same time—are far away from any water, and the Liquidambars, although they colour better with their toes in water, have made more growth in drier ground.

We had *Quercus palustris* in the garden for several years, and though it grew very well, it showed not the slightest sign of colouring in the autumn, so we discarded it. We are now trying it in this damper ground, as we know that under favourable conditions it is capable of showing quite good autumnal colour. On either side of this part of the Storage Road, and also of a path in the bracken at right angles to it, we have planted Nyssas, and if they exist until they become trees of the not inconsiderable size they can attain to in this country, as at Strathfieldsaye, these little avenues should be effective when the Nyssas assume their brilliant October hues.

We now return, and passing on our way the bank on the east side of the Storage Pond, which is planted with Rhododendrons and Azaleas, we reach the main path on the south side of the two top lakes, which we had left when we entered the Red Walk.

From end to end of this path are the trees, here and there, that we consider amongst the most effective in October—such as Scarlet Oaks, Nyssa, Parrotia, Amelanchiers, Japanese Maples, etc.; but Rhododendrons are the chief feature in the near neighbourhood of the lakes, so autumn colour is represented by isolated specimens and not massed as it is in some parts of the wild.

We will now ascend what we call the Red Brow, which starts from the neighbourhood of the end of the Storage Road. A slightly winding path, some 250 yards or so in length, ends on the top of the Brow, which is opposite the house, and is the highest point in the garden. On either side of this path are clumps of Rhododendrons at intervals, and except for these and a few Silver Birches, *Pinus radiata* and *Cedrus atlantica glauca*, it is planted entirely with trees and shrubs that colour in October.

There are a few things here that have not already been mentioned, such as *Rhus Potaninii*, *Pyrus arbutifolia*, etc., but for the most part it is planted with a repetition of what we consider the best things on our soil for autumn colour, so far as we have been able to prove them. We are trying in nursery quarters some few things of recent introduction, but they have to prove their worth before being promoted to the garden.

Having arrived at the top of the path up the Red Brow we will now retrace our steps and return downwards by the same path, as we hope it may be thought not unworthy of being seen from a different point of view.

Having reached the bottom of the slope we turn to our right and will now ascend what we call the Storage Walk, as it runs more or less parallel with the bank of the Storage Pond, and is somewhat shaded by trees and Conifers growing on that bank.

Here in semi-shade are Rhododendrons of a late-blooming cross (R. discolor × Aucklandii) which do not concern us now, but from this Rhododendron walk one gets, when autumn colour is on, a better view, perhaps, of the masses of red on what we call the Red Brow than on the path of the Red Brow itself.

A path at the end of the Storage Walk leads into the main path of the Red Brow, and having reached the top of this we turn down the slope towards the house. Masses of *Berberis Thunbergii*, planted for the view from the house, backed by the taller Reds on the Brow, make an effective picture as we descend. A short way further down we have behind us the wild of the bracken and the bluebell, and returning to formality and shaven lawns we cross the Dell and ascend to the house, whence our ramble started.

Our soil here is mainly sandy clay, and it is so impervious to water that, except on the higher portions of the garden, we find we have to plant many things raised above the general level. In the damper parts of the garden during a wettish period we have tried digging an open drain, where there was a slight fall in the ground. The drain remains dry, and the soil immediately on either side remains as wet as before. Many things resent this condition, and we found the only plan was to plant them on a raised bed. This, however, presented no difficulties as, to give them a good start, we should anyhow have brought in top spit to improve our natural soil.

We give a thick mulching of bracken every winter to all the raised plants, and they do not seem to resent a dry season; but we have to look after them, so far as we are able, until they become established. Our average rainfall is about 30 inches, and except during last summer we have had no drought to count for several years, and even in the exceptional drought of last year the raised things, with their heavy mulching of bracken, did not appear to suffer to any extent.

We lie low, our elevation, roughly, being only about 100 feet, and

having high ground all around us we get more than our share of late spring frosts. Some few years ago the bracken was cut by frost in low hollows in the Park so late as June 28, and another year the foliage of a bed of Begonia 'Lafayette' beside the top lake was distinctly touched by frost in early July.

Having so much water we should like to have Weeping Willows, but as they start so exceptionally early into growth they were repeatedly cut every spring and this, apparently, was too much for them. At all events they were failures, and we could but attribute this to the early checks they invariably received.

I mention these late spring frosts to show the conditions Japanese Maples, which sometimes play so conspicuous a part in the October show, have to face here. They are early starters, and their young growth looks about as tender as any young growth could look, but I do not think we have ever seen it cut, so it must be much more resistant then its delicate appearance would lead one to expect.

As regards autumn frosts our first visitation is often towards the end of September, and sometimes not until the third week in October, but we have never been able to see that this variation has any effect upon the quality or the date of the autumn colour. Almost always our best time, gales permitting, is the third week in October, but in 1933 the last week in October was the best, as the welcome rains in early September upon the warm ground enabled trees and shrubs to keep their summer foliage longer than usual.

Winter frosts would hardly seem to concern the question of autumn colour, except that some things here, such as Nyssas and Pistachias, often lose during the winter a considerable portion of the growth that they had made during the summer.

One word more about the conditions here. We are absolutely sheltered from the North wind, or from any wind that has any appreciable point of north in it; but as the whole garden, more or less, slopes down towards the third and fourth lakes, which lie just about due east, it is only plants that have some shelter on the east side of them that can escape it. We suffered very much in the awful February of 1929, but we cannot see that we have suffered of late years to any material extent from our exposure to the east with the exception of that year.

Amongst the things that we have planted in greatest quantity are the Amelanchiers. All our trees are the same variety, which we believe to be A. canadensis. They colour usually somewhat early in October, when they become a very beautiful rich soft red, which lasts for some considerable time.

Euonymus alatus does well, and lasts in colour longer than most things. Last autumn it was disappointing, but we think it has hardly ever before failed us. E. aldenhamensis is pretty in fruit, and one plant in fullest sun in the wonderful sunshine of last year was astonishingly bright when its foliage coloured in early October, and it kept its best colour for quite a long time.

None of the Rhus family seem to colour well here in the autumn.

The late Sir George Holford kindly sent me a plant of *Rhus Potaninii* which is so good at Westonbirt, but only once has it shown any sign of colouring here. *R. trichocarpa*, which is highly praised for its autumn colour in Bean's admirable book, has not coloured here, nor has *R. cotinoides*. They grow fairly well, but in our soil they seem incapable of producing much if any colour in October.

We have a great many *Photinia variabilis*, all raised from our own seed. This is one of the most brilliant things when it takes on its autumn colour, but it is liable to be more or less spoilt by a rather sharp frost. Last year it was at its best about the end of October (it is usually at its brightest about a week earlier), and 9 degrees of frost in the night of October 27 turned its brilliant red into a red-brown. They were still better than nothing, but they were no longer burning bushes.

Sorbus discolor.—We have a good many of this, and we used to consider it quite good in autumn, but of late years it has disappointed us. All our trees, unfortunately, are grafted, and one could wish we had raised some seedlings when it first berried with us a good many years ago.

Cornus florida and its variety rubra sometimes turn a fair colour in the autumn. C. Nuttallii altogether declines to thrive here.

Parrotia persica.—We hardly think that this does itself full justice with us. We have a few, but we always consider that its usefulness is more as a contrast with the Reds than from any outstanding merits of its own.

Gaylussacias can be very attractive as dwarf plants, but we do not find them easy subjects. They are probably best in a sandy, peaty soil.

Fothergilla monticola.—We have a good many of this raised from layers of our original plant, which was given us by the late Sir George Holford. When at its best it is very good indeed, but its beauty is rather short-lived here, though one gathers that at Westonbirt it keeps its colour an unusually long time.

We have had Stuartias here for many years, but we do not think that any of those that change colour in the autumn have any particular merit in that respect. There are a good many other things that we have which we do not deem deserving of mention in this article. Probably some of the newer things have not yet had time to show their autumn colours to advantage.

Pistachia chinensis only colours with us in some seasons, but when it does it is very effective. It increases in size more slowly than anything here, as in most winters it loses nearly if not quite all the young growth it had made in the preceding summer.

Eucryphia pinnatifolia.—There are a good many of this here, but they have been planted solely for their merits when in bloom. A few, however, turn a fairly good colour somewhat late in November.

We grow a very large number of *Berberis Thunbergii*, which is chiefly planted in masses, but is also effective as isolated plants every here and there. Having a very long period of beauty it is perhaps the very best of the smaller shrubs that colour in autumn. The fruiting Barberries are very effective in the late autumn, as not only

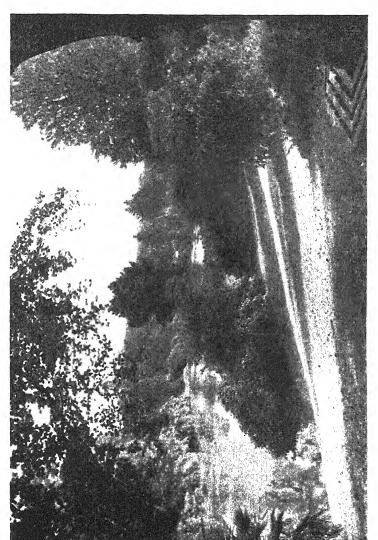


Fig. 61.-- " The Queen's View," Second Lake, Sheffeheld Park.

[To face p. 104.



Fig. 62.—Pinus Pinaster at Sheffield Park.

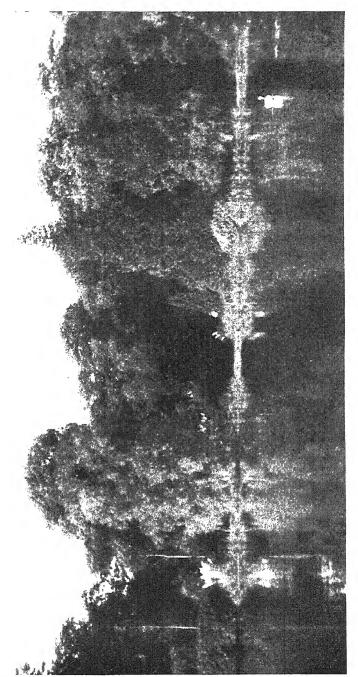


Fig. 63, ... View Across the Top Lake, Sheppheld Park.

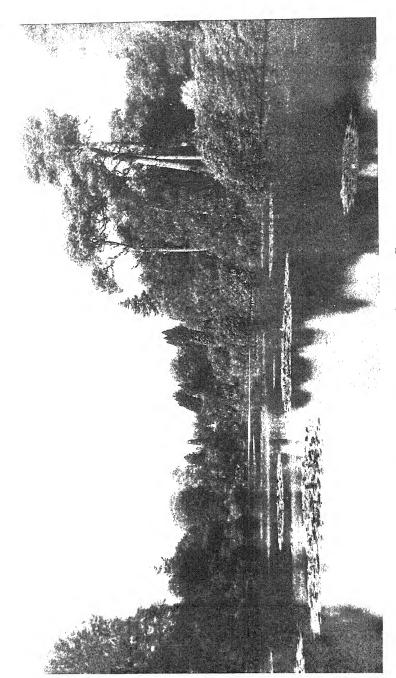


Fig. 64.—The Second Lake, Sheffield Park.

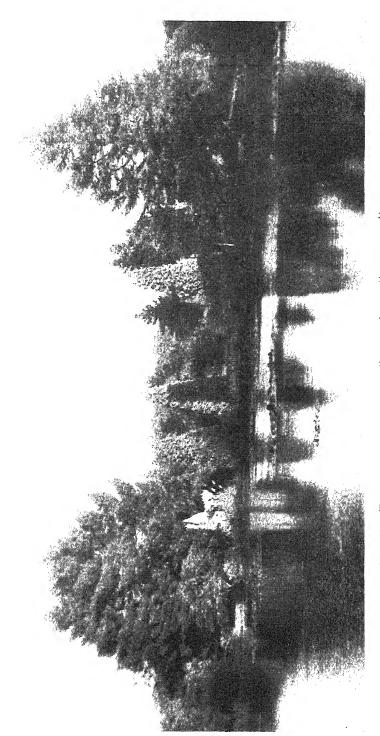


Fig. 65.-The lower part of the Second Lake, Sheffheld Park.

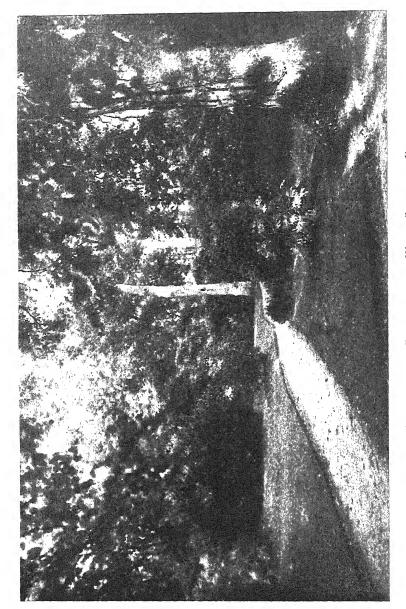
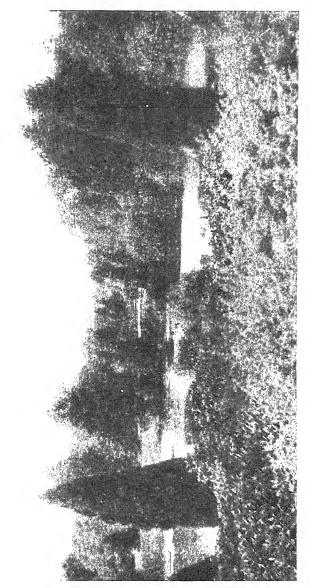


Fig. 66.—A path in the Rhododendron Wood, Sheffield Park.



Pig. 67.—The Second and Third Lakes, Sheffield Park.

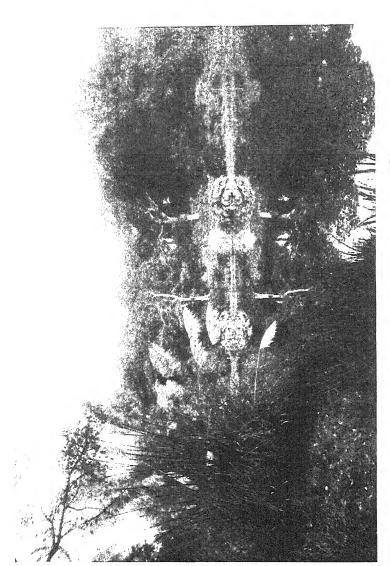


Fig. 68.—View across the Fourth Lake, Sheffield Park.

[To face p. 105.

are they beautiful with their hanging bunches of fruit, but the foliage of many of them takes on a very bright colour in late October or early November. We have long ago discarded named varieties, as we find selected seedlings quite as good if not better. Berberis virescens colours fairly well in some seasons.

Disanthus cercidifolius.—We have had this for a long time and have several that were layers from our original plant. Some of these are nearly as large as the parent plant, which has hardly increased in size for many years. It turns a sort of claret colour, but here, at all events, it is not in the front rank amongst autumn colourers. It is covered with its tiny red blossoms in December.

Stephanandra flexuosa can be quite attractive when it takes on the pinky colour which it sometimes does in October.

Vacciniums.—There would appear to be some confusion in the naming of these, and what some nurserymen call V. corymbosum, others call V. pennsylvanicum. I referred this question to Mr. Bean some years ago, who corresponded on the subject with the botanists in America where the Vacciniums are wild, and I could not gather that any definite decision was reached. Anyhow, what we call V. corymbosum is a somewhat lower grower than the other, with slightly larger leaves, and it always colours in October. What we call V. pennsylvanicum never colours before November, and it is very beautiful sometimes quite into December.

Taxodium distichum is very effective when its foliage assumes its rich red-brown colour, and the slightly pendulous variety is more graceful than the type.

Prunus Sargentii is the first of our really good things to colour in the autumn. It is a fast grower, and it is very valuable for making bright splashes of colour every here and there before most things have begun to turn.

Cercidiphyllum japonicum never seems happy here, and it is evident that our conditions do not suit it.

We grow a considerable number of Japanese Maples of the various kinds, but it is only in some autumns that many do themselves full justice. In 1932 all were extremely beautiful and in 1933 few, if any, were really good. Osakasuki is undoubtedly—here at all events—the most brilliant of them all, and it gives its best colour more often than do any of the others.

Of Rhododendron luteum (Azalea pontica) we have a good many, all planted close to paths, as we consider the attractiveness of their scent when in bloom outweighs their merits as autumn colourers.

Nyssa sylvatica is a very variable species. We have had a plant or so from two sources which distinctly differ from each other in habit. We also have a great many that we raised from seed supplied by MM. Vilmorin Andrieux et C¹⁰, and although there is some variation in their autumn colour, and although one always colours in early October and one not till early November, they are unmistakably of the same type and quite different in habit from either of the other types. There are some of these Vilmorin seedlings at Westonbirt, as hearing from the

late Sir George Holford that he had no Nyssas I sent him half a dozen of my young seedlings in pots a dozen years or so ago. I gather that they consider it a slow grower at Westonbirt, but here, if only it did not occasionally lose some of its summer growth in the following winter, it would be rather a fast grower than otherwise. It is one of the most beautiful things here in the autumn.

Larix Kaempferi, the Chinese Larch, turns an exceedingly rich golden-brown in October, and when in this stage they always attract attention.

Enkianthus campanulatus.—We have seen this a very good colour here, but much more often than not it hardly colours at all. The smaller E. japonicus colours fairly well.

Oxydendron arboreum.—We have struggled for many years with this, and although it is considered to do wherever Rhododendrons thrive, we have quite failed to make it a success either as regards growth or autumn colour.

Cotoneaster divaricata turns an extremely bright colour, but usually not until about the middle of November.

Quercus coccinea splendens is one of our outstanding things, and it lasts in good colour for some considerable time. Q. rubra is generally pretty, but only for a very few days.

Acer griseum is sometimes fairly good, but its foliage drops very soon after colouring. A. nikoense, of which we have had a few trees for several years, have never until 1933 shown any signs of justifying their existence as autumn colourers. However, in that year of sunshine, one in the fullest sun gave us the most beautiful colour, so late as early November, of anything that autumn in the garden. The others were of no particular account, and these did not get all the sunshine that was going. But they were by no means in shady places, and we have so many trees here that it is difficult to find unoccupied spots that give absolutely uninterrupted sunshine. If it only colours well here in fullest sunshine in such a year as 1933, we may have to wait some time before it reproduces the glorious beauty of November last, but it is worth while waiting in expectation and hope.

In conclusion, a pleasing feature of autumn colour is that we have something to look forward to all the gardening year.

In 1933 we had some gloriously still days of blue skies and unclouded sunshine during the first and second weeks in November, and although the chief beauty has generally passed by the end of October, in such an autumn the Scarlet Oaks, late Nyssas, Liquidambar, masses of Berberis Thunbergii and of Vacciniums, the gold of the Silver Birch and the red-brown of the Beech and the bracken, carried on the show of colour so much that the riot of Reds round about October 21 was almost if not quite equalled in effect by the more peaceful beauty of the first half of November.

I should like to add that the photographs of this garden, the reproductions of which accompany this article, were taken by Mr. E. W. PANNELL of Hove.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXX.—Tests of Sodium Chlorate as a Garden Weed Killer, at Wisley.

By M. A. H. TINCKER, M.A., D.Sc.

I will go root away
The noisome weeds that without profit suck
The soil's fertility from wholesome flowers.

GARDENER—"Richard II."

PROBABLY every gardener, amateur or professional, has at one time or another conjured up in his mind the ideal weed killer. What are its attributes? It must be swift and sure in its killing action, be easily handled, and non-poisonous to common livestock, and lastly, not least nowadays, it must be reasonably cheap. In Utopian gardens perhaps the weed killer would differentiate between weed and cultivated plant in its drastic action.

For very many years chemical preparations have been on sale to the public under patents, and though generally quite efficient as weed killers, the poisonous nature of their contents and the necessary care required has caused a certain reluctance in their use, and has even rendered certain preparations forensically infamous! Moreover, the price of these preparations has frequently been such that their general use was further restricted.

For some years the value of sodium chlorate as a weed killer has been recognized. In 1926 HILL (20), after carrying out a series of experiments with weed killers, recommended a I per cent. solution of sodium chlorate for garden paths. In 1927 Griffith (15) carried out experiments on the eradication of that troublesome weed, bracken, on the ffridd land of Merioneth. Various concentrations of the solution employed were tested together with different methods of application. Gardner (12) has more recently brought the use of this chemical to the notice of horticulturists. It seemed desirable to the Wisley Advisory Committee that some further trials, particularly from a garden standpoint, should be carried out, and this article reports the progress made.

THE WISLEY TESTS.

(I) PATHS.

A. Autumn Application (1).

The path was a rolled gravel path overlying a light sandy soil. On this twelve areas, each of 16 square yards, were marked. Control, or untreated areas, alternated with those treated.

Application.—The chlorate was applied dry by sprinkling the crushed powder evenly over the area.

Rates of application:

½ oz. to the square yard (or 4 oz. to 16 sq. yds.).

 $\frac{1}{2}$ oz. to the square yard (or 8 oz. to 16 sq. yds.).

I oz. to the square yard (or 16 oz. to 16 sq. yds.).

o Controls.

Applied 13/9/32.

Weeds: Poa annua (Annual Meadow Grass), Holcus mollis (Creeping Fog Grass—small plants), Taraxacum vulgare (Dandelion), Rumex Acetosella (Sheep's Sorrel), Plantago lanceolata (Plantain), Hypochaeris radicata (Cat's Ear—young plants), Cerastium tomentosum (Mouse-ear Chickweed).

Results.—The broad-leaved plants were killed within 48 hours at the heavier rates of application. At $\frac{1}{4}$ oz. to the square yard the broad-leaved weeds died in 5 days. The annual meadow grass was killed at the heaviest application (I oz.) and died slowly at $\frac{1}{2}$ oz., but at $\frac{1}{4}$ oz. the plants were damaged but persisted.

Rainfall caused a slight washing of the chemical from the area dressed at I oz. to the square yard to the neighbouring control areas. This was effective in killing some of the weeds situated near to the treated area.

Generally the treated areas remained clean during the winter months, but by March a few very small seedling plants of *Poa annua* (annual meadow grass) grew on all the treated plots. It appeared that the weed killer was no longer effective.

A. Autumn Application (2).

A path badly infested with *Poa annua* only was treated with a solution of sodium chlorate of a strength of 2 per cent. Two gallons of this solution was watered on to each 10 square yards of the gravel path on September 16; the weeds were killed in 10 days and the path remained clean throughout the winter and early spring. During the subsequent summer and autumn the path became re-infested with moss and small plants of *Poa annua*. The toxic action of the chlorate had not been permanent, lasting only about 7 months.

B. Summer Application (1), Liquid.

For this test a broad garden path made of rough cinders above flints was used; the path was infested with large numbers of common weeds such as dandelions, broad-leaved plantain, white clover, cat's ear and annual meadow grass. A number of strips each 20 square yards in area were marked off, and I gallon of solution was applied by a watering can to each IO square yards on June IO. The concentrations employed were 5 per cent., and where the grass grew thicker, IO per cent. The weaker solution quickly killed the broad-leaved

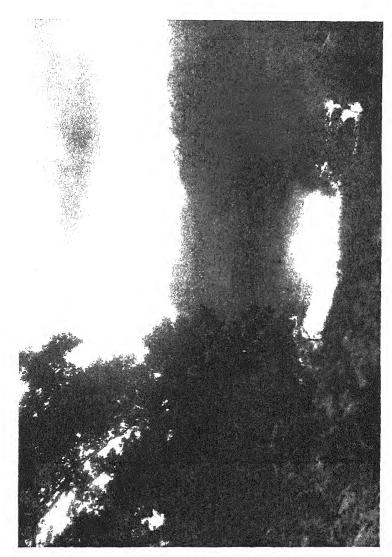


Fig. 69.—Looking across the Fourth Lake, Sheffield Park.

Application.—The chlorate was applied dry by sprinkling the crushed powder evenly over the area.

Rates of application:

 $\frac{1}{4}$ oz. to the square yard (or 4 oz. to 16 sq. yds.).

 $\frac{1}{2}$ oz. to the square yard (or 8 oz. to 16 sq. yds.). I oz. to the square yard (or 16 oz. to 16 sq. yds.).

o Controls.

Applied 13/9/32.

Weeds: Poa annua (Annual Meadow Grass), Holcus mollis (Creeping Fog Grass—small plants), Taraxacum vulgare (Dandelion), Rumex Acetosella (Sheep's Sorrel), Plantago lanceolata (Plantain), Hypochaeris radicata (Cat's Ear—young plants), Cerastium tomentosum (Mouse-ear Chickweed).

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Rainfall caused a slight washing of the chemical from the area dressed at I oz. to the square yard to the neighbouring control areas. This was effective in killing some of the weeds situated near to the treated area.

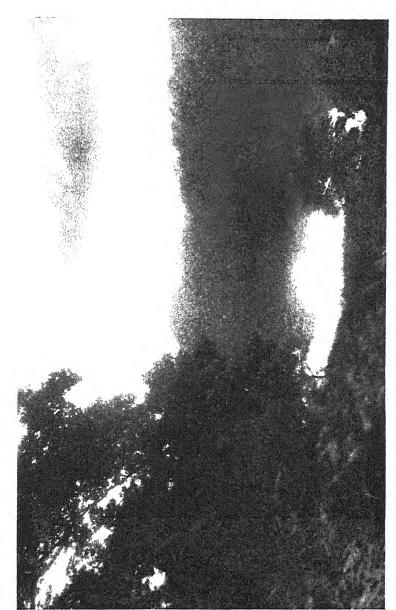
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Pig. 69,--Looking across the Fourth Lake, Sheffield Park.

[To face p. 109. Fig. 70.—View from the top end of the Fourth Lake, Sheffield Park.

plants, but the grass proving more resistant was only killed outright by the stronger solution. During the hot dry weather of summer the path remained clean and in late October was still free from weeds.

B. Summer Application (2), Dry Powder.

Another length of this path with a rougher surface was similarly divided into strips of 20 square yards. The plots were treated with the dry chemical applied at the rates of $\frac{1}{2}$ lb. to 10 square yards and 1 lb. to 10 square yards. After the application rain fell on the fourth day. The broad-leaved plants were killed, but several tussocks of grass though severely damaged survived. Otherwise, the path remained clean throughout summer and early autumn.

(2) NEGLECTED GARDEN PLOTS.

A strip of ground which had been trenched in early January had remained untouched for nine months and had become thoroughly colonized by a dense mat of vegetation consisting of a mixture of close growing weeds in which the dominant plants were tufted grasses. On this a series of plots of 10 square yards were marked.

Application (I lb. in I gallon of water reckoned as IO per cent).— The weed killer in solution was applied with a watering can, at the rate of I gallon to each IO square yards. The concentrations tested were 2, 4 and 8 per cent. Date of application September I4. Control plants were sprayed with water only.

Weeds present: Agrostis sp. (Bent), Holcus mollis (Creeping Fog), Dactylis glomerata (Cocksfoot), Plantago lanceolata (Ribwort plantain), Polygonum aviculare (Knotweed), Rumex crispus (Curled Dock), R. obtusifolius (Broadleaved Dock), Sonchus arvensis (Sowthistle), Hypochaeris radicata (Cat's Ear), Capsella Bursa-pastoris (Shepherd's Purse), Matricaria inodora (Scentless Mayweed), Achillea Millefolium (Yarrow), Ranunculus repens (Creeping Buttercup), Verbascum sp. (Mullein, seedlings), etc.

Several of these weeds had produced flowering stalks over a yard in height.

Results.—Two days after application all the treated plots showed the action of the weed killer; grass, particularly Holcus lanatus, proved resistant, and at the lowest concentration of 2 per cent. appeared undamaged. However, these plants later succumbed so that all the weeds were finally killed.

On individual large leaves, such as those of Verbascum, the spread of the area killed was slow. Lateral conduction of the weed-killer solution did not appear to take place readily or rapidly. The deep roots of dock plants of which the sprayed leaves were dead were examined a week after the application of the weed killer and were apparently healthy then. The poisonous action had not passed down the plants; they succumbed later, possibly due to the soaking

into the soil of the weed killer. In other plots docks have survived and produced new leaves.

The last plants to succumb on all plots were grasses, of which Holcus lanatus proved most resistant. The creeping buttercup appeared to be fairly resistant to the chemical, but no doubt this was partly due to the habit of the plant which prevented contact with the chemical, whilst other plants protected it.

For immediate drastic action 2 per cent. proved rather too weak a concentration at the rate of application of I gallon to IO square yards. Four per cent. was decidedly better.

After Treatment.—For one month after the application the dead weeds were not touched and remained fully exposed to the action of the weather; much of the soluble sodium compounds was washed into the soil. Then the debris was removed from the surface of certain plots by a rake, and on lightly forking, a fine tilth suitable for seed sowing was readily obtained. Other plots were left undisturbed.

Drills of lettuce seed were sown with the variety 'Stanstead Park' on October 18. Seeds of Lupinus polyphyllus were also sown. The lettuce germinated satisfactorily in 6 days, the resulting seedlings established themselves well, and they subsequently over-wintered. No signs of any adverse influence of the weed killer were apparent as control plants grown in plots on which no weed killer had been added were precisely similar.

The deeper rooted seedlings of the Lupins also grew fairly well.

By November I many thousands of very small seedlings were visible on all the plots from which the dead weeds had been removed and which had been forked. The rapid germination and growth of these volunteers provided further evidence of the removal of all poisonous chemicals from the surface layers of the soil. The seedlings were subsequently identified as Senebiera didyma.

During the subsequent spring and summer the plots became infested with weeds, showing the temporary nature of the weed killer.

(3) TALL WEEDS.

A. Urtica dioica (Stinging Nettles).

Eight plots (each 60 square yards) were measured on rough ground which had not been cultivated for many months. A dense mass of tall nettles covered the entire area at the time of application.

Application-in Solution.-The weed killer was applied on October 6 in solution by watering it on to the tall weeds at a rate of I gallon to Io square yards. The concentrations tested were IO per cent. (I lb. to I gallon) and 5 per cent. (8 oz. to I gallon).

Resulting Control of Urtica dioica.—The nettles were quickly killed, turning brown in a few days; the two concentrations appeared for all practical purposes equally efficient.

After Treatment and Observations.—The dead plants were removed at the beginning of the year. In mid-March no nettles appeared above the ground in the treated areas; on untreated areas the new growth had already attained a height of 9 inches to 12 inches, but on the treated areas many plants of Ranunculus Ficaria (Lesser Celandine) were observed. The tuberous roots of these plants were well developed and healthy; it was probable, therefore, that the chlorate had not come in contact with the tubers of the previous season. During the subsequent summer further weeds invaded the plots, but no nettles were found; the creeping rootstock had been killed by an application to the leaves. No damage to trees near the nettles was observed.

Application—Dry.—On other plots dried powdered chlorate was sprinkled at the same rates of application, I lb. and ½ lb. to IO square yards. This method appeared equally effective in killing nettles, but rather more difficulty was experienced in covering the area with the allotted weight of chlorate. The killing effect was again apparent in several days. Small Willows and a Hop plant growing in the immediate vicinity were not destroyed.

B. Phragmites communis (Common Reed).

Application.—When applied at the rate of I lb. to IO square yards fairly effective control of this reed was obtained by sodium chlorate. Generally the creeping rootstocks did not produce further leaves in the following spring; but the control was not absolutely completed by only one application, for a few young shoots appeared in April. In number they were estimated at 0.5 per cent. of those present on untreated plots near by.

On a plot sprayed with a 5 per cent. solution the Phragmites was also very severely damaged, but in the subsequent spring more young shoots appeared. Here many plants of Narcissus (varieties) grew quite well, the bulbs growing at a depth of some 4 inches to 6 inches had not been adversely affected by the application of the weed killer to the reeds in autumn.

C. Rubus fruticosus (Bramble).

A plot, 60 yards in size, was marked out on a bank of low growing brambles situated near the river.

Application.—The weed killer was applied by a watering can with a fine rose-nozzle in a solution of 10 per cent. concentration at the rate of 1 gallon to each 10 square yards (equivalent to 1 lb. of sodium chlorate to 10 square yards). Other plots were sprayed with a 5 per cent. solution at a rate of 1 gallon to 10 square yards.

Subsequent Control.—A week after application the leaves of the brambles were dead, and the stems showed injured patches—the brown dead bark contrasting with the crimson-lake coloured living tissues. On cutting the stems at intervals it appeared that the tissues

of the bark and phloem were killed; where the stem was "girdled" by a complete band of dead material the apical portions soon died. In other cases the unsprayed portions died more slowly, but the plants were finally killed out. The dry brittle stems were easily broken in spring. The weed killer was effective but did not obviate the necessity for further manual labour required for cleaning away the prickly stems, etc. The weed killer was effective at concentrations of 5 per cent. and 10 per cent. The dense tufts of grass were killed by the stronger solution.

In March seedlings of Alliaria officinalis (Garlic Mustard) and Galium Aparine (Goosegrass) were established on the plots. Several small plants of Rumex crispus (Curly Dock) and Holcus lanatus had not been killed by the application of the 5 per cent. solution and successfully over-wintered. Possibly these plants had not come into direct contact with the weed killer, the taller brambles affording them protection. In the following summer further weeds invaded the plot, again showing the temporary nature of the toxic action of the chlorate.

D. Ulex europaeus.

On a piece of rough ground plots (each 60 square yards) were marked out so as to include large well-grown gorse bushes (5 to 6 feet in height). The other vegetation present consisted of sapling birch and oak and coarse tussocks of grass, with a few taller birches.

Application-Solution; Failure.-By means of a watering-can sodium chlorate was applied in solution at the rate of I gallon per Io square yards; the concentrations were 5 per cent. and Io per cent. The date of application was October 7. By October 13 it was apparent that the small sprayed saplings and grass had been greatly damaged by solutions of both concentrations. The gorse showed no obvious ill-effects.

Application—Dry Powder; Successful.—At the beginning of November, the gorse was dusted with the powdered chemical applied at the rate of $\frac{1}{2}$ lb. to 10 square yards. A small rotary dusting machine was employed.

Subsequent Control.—The gorse was killed, and no new growth took place in the early spring. Large birch trees growing in the plot, whose leaves did not come into contact with the chemical, were not affected in the first year. The chemical had not reached their roots in sufficient strength to prove toxic. The killing out of nettles and gorse in the vicinity of trees which were undamaged points to the possibility of using this chemical successfully as a weed killer for nettles under trees. Care, however, must be taken to ensure that the solution falls on the leaves of the nettles and that large volumes of the solution do not saturate the soil in the vicinity of tree roots near the surface.

Subsequent Burning.—Small plots of tall (2 to 3 feet) rank grass and other weeds were treated in late June with solutions of sodium

chlorate which proved efficient in killing the weeds. In July after a period of 14 days hot dry weather the dead plants were deliberately set on fire. The rate of burning was increased only where the longer grass had received the heaviest application of the chemical; it was doubtful at the usual rate of application of solutions of 10 per cent. and 5 per cent. concentration whether there was any real advantage gained in ease of burning by the application of so little chemical to the area.

GENERAL EFFICIENCY.

Tests of the efficiency of sodium chlorate as an agricultural weed killer have been made at many of the American Agricultural Experimental Stations (5, 16). Latshaw and Zahnley (24) report its efficiency against field Bindweed (Convolvulus arvensis). Harper (18) employed it successfully against Johnson Grass (Holcus halepensis), Aslander (6) controlled the Canadian Thistle (Cirsium arvense) and Hansen (16) reports on a number of species, including Symphoricarpus, which proved more resistant to the toxic action, and Barberry (B. vulgaris), which required thorough wetting of its leaves with the solution to insure successful control.

From Australia (28) and New Zealand (10) favourable reports have also been published on the use of this chemical against various weeds and especially against Ragwort (Senecio sp.). The list of species mentioned by DEEM (10) includes Ragwort, Pennyroyal, St. John's Wort, Ox-Eye Daisy, and Californian thistles. Ling and Haggard (25) found that sodium chlorate applied in autumn at the rate of 2 cwt. to the acre proved generally efficient, but strong deep-rooting docks were almost unaffected. The chemical method proved cheaper than mechanical eradication.

Other reports in Great Britain concern observations upon the toxicity of sodium chlorate to Hawthorn and many common weeds such as Buttercup, Pimpernel, Selfheal, Plantain, Sowthistle, Forgetme-not, and Bent grass. The Garlick Onion (Allium rivale) proved most resistant and only strong (10 per cent.) solutions effected a control. Against nettles Bates (7) recommends a 5 per cent. solution applied at 1 gallon to the square yard. Yamasaki (33) tested potassium chlorate as weed killer and also (32) reports the interesting observation that in diecious plants such as Gingko biloba and Cannabis sativa the staminate plants proved more resistant than the pistillate when placed in weak solutions (0.03 per cent.) in the dark for a day.

Sodium and Other Chlorates and Chemicals.—The toxic action of sodium chlorate is due to the chlorate ion; calcium chlorate and potassium chlorate (32) are also efficient weed killers. Sodium chlorate appears to have preference in that it is now cheaper than the potassium salt. It is more readily soluble than the calcium compound. TIMSON (29) and GODEL (13) tested a number of salts and found sodium chlorate most effective.

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HULBERT, BRISTOL and BENJAMIN (23) recommend the use of sodium chlorate alone as it is then more effective, judged on a basis of weight of salt applied, than when mixed with deliquescent salts. They also emphasize that the chlorate content of the chemical (or chemicals) applied is a reliable index of efficiency. WILLARD (31), however, found that limestone and sodium chlorate mixed were suitable for dry application.

Time of Application.—The chemical kills the vegetative parts of the plant by direct contact; it appears that the best time of application is when the weeds are in full leaf and vigour. Latshaw and Zahnley (24), and Hulbert, Remsberg and Spence (22) observe that mature plants are particularly susceptible; in the New Flora and Silva (4) the writer of the quarterly notes recommends the application when the plants are in full leaf. The Cambridge [see Gardner (12)] trials also indicate that the late summer is a suitable season for application and that in certain species the plants are more resistant in early spring and so need larger doses of the chlorate.

Applied to paths it is advisable to choose a period of dry weather to avoid the chemical being washed away by rain, and washed on to neighbouring borders or flower plots; damaged plants have already been submitted by Fellows to the pathologists in this Laboratory for diagnosis. The Scottish observations of Hill (21) also showed that an increased rainfall during the first week of application impaired the efficiency of the weed killer. Delevoy (11) also obtained better results in sunny weather. A consideration of the after effects also favours early autumnal application. Briefly it appears that the best time to apply the chlorate is in late summer during a dry spell of weather. Muenscher (26) also found late autumn a satisfactory time at which to apply the chlorate dry.

Method of Application.—The chemical may be applied dry or in solution. In gardens where small areas are to be covered and a great bulk of water is not required, the use of a solution ensures even distribution. On larger areas, agriculturally, it may be more convenient to use the dry powder. The solution can be sprinkled on by an ordinary water-can or forced against the foliage to be destroyed by a high pressure sprayer delivering a fine jet of solution.

Rate of Application and Concentrations.—The dose to be effective depends on the concentration and rate of application to the area to be treated; a reasonably large bulk of weak solution appears to be as effective as a smaller quantity of more concentrated solution. The weight of chlorate added is the important point.

Timson (29) in Rhodesia found that 1½ per cent. was sufficiently strong to control "Witch weed."

A solution of I per cent. has proved effective in killing path weeds (HILL) and nettles; HEESENLAND and FROMAN (19) recommend a 2 per cent. solution for general purposes, and WALTON (30) found a slightly less concentrated solution (1½ per cent.) applied at a rate of I gallon to 100 square feet effective in killing small weeds. In the

Wisley experiments $2\frac{1}{2}$ per cent. was fairly effective at a rate of I gallon for 10 square yards.

Higher concentrations (6 per cent.) have been recommended for couch-grass and thistles, and 8 or 9 per cent. for bindweed was recommended by Latshaw to be applied at 100 gallons to the acre. Hansen (16) used a 10 per cent. solution for larger shrubs, and Rowley (27) found that two applications of 10 per cent. at 250 gallons to the acre were effective for killing twitch (Agropyron repens.)

Agriculturally, applications of I or 2 cwt. to the acre have been found satisfactory.

Considering all the evidence, it is now recommended that I lb. dissolved in I gallon, giving a 10 per cent. solution, should be used on large grasses or very resistant weeds with deep root stocks, at the rate of I gallon to Io square yards (or approximately). For herbaceous weeds, and small grasses, a 5 per cent. ($\frac{1}{2}$ lb. to the gallon) solution applied at I gallon to Io square yards is efficient. For small annual weeds (other than grass) a $2\frac{1}{2}$ per cent. solution (or $\frac{1}{4}$ lb. to the gallon) applied at I gallon to Io square yards is effective.

For paths, using the material dry (or dissolved in I gallon of water), 8 oz. to 10 square yards, is a useful and effective dressing; for very badly weed-infested paths two applications may be needed.

Weeds in Pastures and Lawns.—Sodium chlorate applied at the low rate of 40 lb. to the acre to thistles reduced the number of weeds by as much as 73 and 84 per cent. in tests made for manufacturing chemists (3). Heavier applications of the chemical (80 lb. and 120 lb.) to the acre injured the grass, and although autumnal application was generally the more satisfactory at the heavier rates the grass did not completely recover by the spring.

GRAU (14) reports the use of sodium chlorate against "Crabgrass" (Eleusine or Panicum sp.) and other weeds as Chickweed and Purslane; this work was carried out in connexion with the U.S.A. Golf Green Association. The usual weeds of lawns may be checked by the use of ammonium sulphate and iron sulphate which encourage the grasses and it is particularly interesting to observe the effect of the chlorate in checking an undesirable species of grass. GRAU also reports that he obtained complete control of the Crabgrass with sodium chlorate and also found ammonium thiocyanate promising. In this case the weed-a grass-could not be checked by ammonium sulphate and iron sulphate. In using sodium chlorate on lawns the differential susceptibility of broad-leaved weeds and grasses to the chlorate plays an important part; strong solutions and heavy rates of application cannot be employed and solutions of 2 or 21 per cent. are recommended, applying I gallon to each IO square yards. The grass may be temporarily checked, but should recover; strong solutions or heavy applications of iron sulphate and ammonium sulphate will also "burn" the grass for a period, but the soil reaction is changed in favour of the grass.

DISADVANTAGES AND DANGERS.

Fire.—Sodium chlorate is a compound rich in oxygen and therefore when dry may act as an aid to combustion. All clothing and shoes saturated with sodium chlorate solution should be dried very carefully and should not be exposed to flames or sparks. When mixed with certain chemicals such as carbohydrates (sugars, starches, cellulose) or organic fertilizers, and agitated, sodium chlorate may ignite or even prove explosive. The weed killer should not be distributed by dirty machines previously used for guanos, or artificial manures.

Used in solution the sodium chlorate is perfectly safe, provided that the danger of fire to saturated and dried materials is safeguarded. Dry dead vegetation killed by sodium chlorate may more readily ignite. Calcium chlorate has the advantage that it is less inflammable in dry mixtures.

Leaching and After Effects in Soils.—The chlorate is unstable in the soil and presumably changes to the harmless chloride (common salt) as the result of reduction. It does not accumulate in the surface layers, therefore, as a soil poison, and may be all decomposed or leached away in a few months.

HARPER (18) noted that the activity of the soil fauna and bacterial flora was reduced after applying the chlorate, as was the soil nitrifying power. The chlorate itself was decomposed in about 7 days, but for a full discussion on such points as leaching, and upon microbiological activity the reader is referred to Bowser's and Newton's (8) report dealing with chlorates and other salts used as weed killers.

The agricultural tests indicate that early autumnal application of chlorate may be safely followed by spring sowing or planting. Spring treatment of the soil delays spring or summer planting. Wisley tests showed that provided the dead weeds were removed and the ground forked lightly, both deep and shallow rooted seedlings might grow after an interval of only four weeks. As sodium chlorate does not have a lasting toxic effect on the soil, perhaps its transient toxicity may prove to be a distinctive virtue. Arsenical weed killers remain in the surface of the soil for quite a long period (over 6 months) and may prove fatal to poultry and other stock taking up small quantities with flints and chips [HILL (21)], although permitting the growth of plants and the recolonization of the ground by weeds. Strong hypertonic solutions or ordinary salt used at a 10 per cent. concentration (I lb. per I gallon) are frequently employed as weed killers. These solutions kill by withdrawing water from the weeds and preventing further uptake of water by the plant. The duration of their action, however, is short, as rainfall causes dilution and the soluble salt leaches away rapidly. There are points of similarity, therefore, between the two sodium salts, chloride and chlorate, when used as weed killers; both are readily soluble, and do not give a permanent control, the chlorate kills quickly and surely, the chloride rather more slowly and rain may interfere with its action. There is

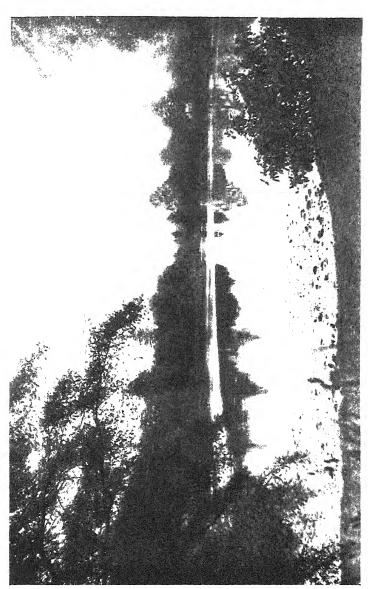


Fig. 71.1 The Top Lake, Shepfield Park. $(p,\,q7)$

one important point of difference and that is the price: the chlorate is much more expensive.

Live Stock.—Deem (10) states that under certain conditions sodium chlorate in small quantity may actually prove a tonic to cattle, but Bringl and Windheusen (9) state that continued small quantities in fodder produced ill-effects on sheep and goats. McGrath (28) point out the danger of animals eating enough sprayed herbage to ensure the consumption of a fatal dose—about 3 oz. for a sheep. In gardens and on small areas it is unlikely that any domestic animal would take up a fatal dose; where regular grazing occurs due care is necessary to prevent live-stock from immediately grazing sprayed foliage.

Costs.—The wholesale price of sodium chlorate is now approximately 38s. 6d. per cwt. from the manufacturing industrial chemists, that is about 4d. a lb. bought wholesale. Therefore, dissolving the chemical to give a 5 per cent. (1 lb. to the gallon) solution, which will prove effective against most weeds, and applying it at I gallon to 10 square yards, will cost 2d., or approximately 6d. for a square rod (pole or perch) of 30½ square yards without labour charges.

With small weeds or plants easily killed by a I or 21 per cent. solution the cost of the chemical can be reduced to about $1\frac{1}{2}d$., or 3d. a rod (labour excluded), with difficult weeds the cost would be about is.

In reckoning the cost of application the time saved in subsequent labour must be considered, but as the dead weeds may have to be cut down (or burnt if dry) and the ground subsequently tilled, there is not as great a saving as at first appears.

Applied to large areas the cost of chemical at 2 cwt. to the acre (224 lb. for 4840 square yards) may be reckoned at £3 17s. an acre, exclusive of labour required in application.

Conclusions.—Considering all the available evidence sodium chlorate is recommended as a weed killer for garden paths, neglected plots, and for the eradication of certain troublesome weeds. the chemical may be used as a dry powder its use is particularly recommended as safer in solution, of concentration 21 per cent. for small weeds, 5% per cent. for herbaceous weeds, and 10 per cent. for particularly troublesome weeds, with deeper rootstocks, at a rate of application of I gallon to Io square yards. The weed killer is decomposed in the soil and planting may safely take place after an interval of 4 to 6 months, and in many cases even earlier. Early autumnal application is most likely to prove convenient and remunerative; the plants to be destroyed should be growing vegetatively (i.e. in leaf). Care is required in the use of the chemical.

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CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXXI.—Antirrhinum Rust. A Disease New to Great Britain, caused by the Fungus Puccinia Antirrhini Diet. & Holw.

By D. E. Green, M.Sc., Mycologist.

THE cultivated Antirrhinum or Snapdragon (Antirrhinum majus L.) is a very popular plant in this country, and is especially important in garden decoration. It has now been brought to a high degree of perfection. In the breeding and selection of plants having large and highly coloured blossoms the question of disease-resistant characters seems to receive little or no consideration. The Antirrhinum plant is no exception as it is often attacked by two or three fungus diseases in Great Britain. This summer another fungus disease of Antirrhinums has made its appearance in this country and was first recorded by the writer on July 2, 1933, when specimens obviously badly diseased were sent from Kent to the Laboratory for examination. It was evident that the plants were not attacked by any of the usual diseases and the trouble was soon identified as Antirrhinum Rust, caused by the fungus Puccinia Antirrhini Diet. & Holw., a disease hitherto existing only in Canada, Bermuda, and the United States of America. The occurrence was reported to the Ministry of Agriculture's Laboratory at Harpenden, from which source much information on the disease was received. As the presence of the disease was most unwelcome, and its spread a matter of concern, a note warning growers to destroy any rusted plant was published in the Horticultural Press.* and at the same time a similar warning was issued in the Daily Press by the Ministry of Agriculture.

Some of the larger growers were also warned by the Society, and steps were at once taken to discover, if possible, how the disease entered this country. This will be discussed later.

SYMPTOMS OF THE DISEASE.

The disease occurs on plants of all ages, from seedlings and cuttings up to mature plants about to flower. The first sign of attack is the appearance, on the under side of the leaf, of small light coloured spots or patches which can be seen showing through the upper surface and which rapidly produce brown-coloured pustules. This change is brought about by the growth of the fungus inside the leaf in which it forms masses of brown spores, and with further growth these spore masses rupture the overlying epidermis and are exposed to the air.

^{*} See e.g., Gard. Chron., vol. xciv, August 12, 1933, p. 131.

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(figs. 73, 74). The pustules appear at any point on the leaf surface and at first mostly on the under surface, but later on the upper surface as well. These pustules contain a powdery mass of spores (uredospores), which, when dry, can be blown about, or dispersed in other ways, and thus spread the disease to other leaves and stems. Infection of leaves is said to take place always through the stomata. On the stem the

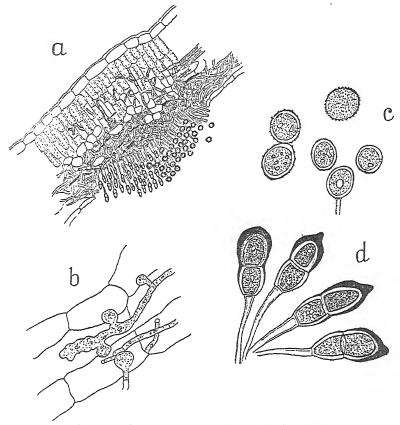


Fig. 72.—Antirrhinum Rust (Puccinia Antirrhini).

a. Section through mixed pustule on leaf. X 100.

b. Fungal hyphae in leaf cells showing swellings (haustoria).
c. Uredospores. × 380. d. Teleutospores. × 44

pustules are elongated (fig. 73), and generally much larger than those found on the leaves-it follows that the stem can easily be girdled and the entire branch killed.

Later in the season another type of spore, the teleutospore, appears, having thicker walls and being darker brown in colour. These spores are the ones usually formed by rust fungi in order to overwinter. are borne on leaves and stems, sometimes in new spots, or in the same spot (sorus) as the uredospores, by pushing up from the same stromatic cushion and following after uredospores (fig. 72, a). All parts of the plant are attacked, pustules are commonly found on the calyces (fig. 74), and one specimen sent to the Laboratory bore pustules on the seed pods. Slight attacks will spoil the appearance of the plant, lowering its vitality and resulting in short spikes and short flowers. In severe cases stems and branches are killed and the plant withers and dies.

THE PARASITIC ORGANISM.

The fungus causing the rust is *Puccinia Antirrhini* Diet. & Holw. Its colourless septate mycelium ramifies in the leaf tissues between the cells which it enters by means of haustoria.

The haustoria are constricted at the point of entry to the cell, but inside they broaden, and are sometimes knob-like (fig. 72, b). The mycelium begins its spore bearing by forming a densely interwoven mass of fungal threads (a stroma), and from this stroma the sporebearing hyphæ are produced. In Antirrhinum rust only two spore types are at present known, viz. uredospores (spring and summer infection spores), and teleutospores (autumn and winter resting spores). The former, as is well known, are formed for the purpose of infecting plants during favourable conditions in summer, and the latter, with their thicker walls, are the spores which usually in the rust fungi are adapted to survive the winter and carry on the disease to another season. The uredospores (fig. 72, c) are spherical or slightly oval, measuring from 19 \mu to 30 \mu in length and from 15 \mu to 22 \mu in diameter, the average being about 22 $\mu \times 19 \mu$ (100 measured). They are borne on stalks or pedicels, from which they are released when mature. They are yellowish brown in colour; the wall has germ pores and is covered with very short spines, giving the mature spore a warted appearance. The teleutospores (fig. 72, d) vary greatly in shape. They are 2-celled and slightly constricted at the septum, and the walls are smooth. The base is blunt, but the apex may vary from very blunt to sharply pointed. The colour is much darker than that of the uredospores, being dark brown to almost black. They are from 33 μ to 52 μ in length, averaging 44 μ , and 17 μ to 24 μ in diameter, averaging 22 \mu (100 measured). Each of the two cells possesses one germ pore. Generally part of the stalk can be seen still attached to the teleutospore.

HISTORY AND PRESENT KNOWLEDGE OF THE DISEASE.

Antirrhinum rust was first discovered in California and Oregon in 1895. It is now widespread over the United States of America, and is also found in Canada and Bermuda. Growers in the U.S.A. consider it the most serious disease of Antirrhinums under glass, and as these plants are grown there extensively for flower production in the greenhouse, the disease is one of serious economic importance. Thurston in Nebraska in 1919 reported 25 to 50 per cent. plants killed, in some cases almost causing Antirrhinum growing in several large greenhouses to be given up. The uredospore stage was the only one seen in Nebraska. The disease was first reported in Bermuda

by Whetzel in 1922, uredospores and teleutospores being present, and the rust was described as being very destructive.

As may be expected much research work on the disease has been carried out in America and the work of Doran, Butler, Mains, and others has revealed many facts which now become of particular interest to workers in this country. DORAN,* working mostly in the Laboratory, found the optimum temperature for the germination of the uredospores to be well defined at 10° C. (50° F.). If the temperature is varied only 2°C. above or below this optimum the germination is decreased by about 50 per cent. In his infection experiments he found that increasing the temperature 5° to 8° C. above the optimum reduced infection by 90 per cent. His results confirmed those arrived at by many investigators, namely, that the spores of rust fungi germinate best under rather cool conditions. He also demonstrated that freezing did not prevent the germination of the uredospores, nor shorten their life, but even under ordinary conditions they were not usually long lived and little germination occurred after 4 weeks and none after 8 weeks. It is evident that the uredospores themselves cannot carry the disease over a long period, but unfortunately the disease can live over the winter on a rusted plant, which will produce uredospores as soon as conditions become favourable.

Doran* made numerous attempts to germinate the teleutospores under many varied conditions, but was always unsuccessful, and therefore concluded that the teleutospores were non-functional. Peltier; in many experiments also failed to germinate the teleutospores. However, Hockey, and later Mains, both reported successful germination of the teleutospores, all of which had been subjected to winter conditions of temperature, in one case 14 per cent. germination being obtained when the teleutospores had been frozen outdoors for only one day. The teleutospores produced basidiospores, in some cases abundantly, but neither HOCKEY nor MAINS ever succeeded in infecting young Antirrhinum plants with the germinating teleutospores. Mains carried out tests over five years and obtained germination in teleutospores in December and also in April, but the germination was always most abundant in December and January, i.e. soon after maturity. Continual sowing of germinating teleutospores on young Antirrhinum plants even with humidity at saturation point failed to produce infection. Nevertheless Mains concluded that the teleutospores must be taken into consideration and that there is an alternate host in the life cycle which is infected by the teleutospore. This means that he considered the fungus is a heterocious rust fungus having all the spore forms in its life cycle. If so the teleutospore is

^{*} DORAN, W. L. "Rust of Antirrhinum," Massachusetts Agric. Exp. Sta.,

^{*} DORAN, W. L. "Kust of Antiffindum, Massachusetts Agric. Eap. Col., Bull. 202, 1921, p. 39.
† Peltier, G. L., and C. C. Rees. "A New Rust of Economic Importance on the Cultivated Snapdragon" (abs.) Phytopathology, 4, 1914, p. 400.
‡ Hockey, J. F. "Germination of Teliospores of Puccinia Antifrihini," 13th Ann. Rept. Quebec Soc. Prot. Pl., 1920–21, p. 54.
§ Mains, E. B. "Notes on the Life History of the Snapdragon Rust, Puccinia Antifrihini, Diet. & Holw.," Phytopathology, 14, 1924, p. 281.

only a source of danger when the alternate host is present to produce the æcidial stage, and Mains suggests Adenostegia species as a possible alternate host, but points out that much cross-inoculation work is necessary before this can be proved. Adenostegia species are not found in Great Britain. Despite his theory of the existence of an alternate host for the æcidial stage Mains agrees with Doran that the rust does not need the other host, and that under greenhouse conditions and in localities where the plants can overwinter, the disease can be carried over on the Antirrhinum plant, and recommence each season by the production of uredospores. In the south of England Antirrhinum plants are often allowed to overwinter either outdoors or as cuttings under glass; this is obviously one source of danger and shows the need for the destruction of all Antirrhinum plants this winter in gardens where the disease has occurred.

PRESENT KNOWLEDGE OF THE CONTROL OF THE DISEASE.

Doran also worked in the Laboratory with a view to finding some indication of the best method for control. He first tested various fluids containing copper (including Bordeaux mixture) for their toxic effects on the uredospores and found that copper sprays were not toxic to the uredospores except at strengths which damaged the foliage. Other tests with sulphur showed that sulphur was toxic to the uredospores, but only at a fairly high temperature (e.g. 70° F.), when its reaction with the oxygen of the air forms the toxic agent sulphur dioxide. For the maximum reaction to occur sulphur in the form of finely divided sulphur dust is the most suitable, as it exposes the greatest surface to the air.

BUTLER* has carried out experiments on the control of the disease in the field and in the greenhouse. Using five different coppercontaining sprays, including Bordeaux mixture, he found that at strengths that would not damage the foliage the control was negligible. Using sulphur, he tested lime-sulphur (I in 50) against finely divided sulphur-dust, and discovered the spray to be less efficient than the dust which he assumes to be due to the fact that there is a better distribution of the sulphur as a dust than as a spray. He further discovered that the efficiency of the sulphur depends on temperature conditions, and that dusting with sulphur is effective only when the daily temperature is 72° F. or over, for 8 to 12 hours during the day. For good control at least 50 per cent. of the days must fulfil these conditions. A week with a mean daily temperature of 68° F. was suitable, but one with a mean daily temperature of 63° F. did not give satisfactory control with sulphur dusting. It is stated that with thorough sulphuring and these temperature conditions spores are killed, sporulation in the old sori ceases, and control was attained.

^{*} BUTLER, O. "Experiments on the Field Control of Snapdragon Rust, together with a description of a Method for the Control of the Disease in Greenhouses," New Hampshire Agric. Exp. Sta. Tech. Bull., 22, 1923.

In the greenhouse Butler advocates a method which he says will prevent the spread of the rust and also prevent any further damage to already diseased plants. The method consists firstly in removing and burning seriously diseased shoots. The temperature is then raised to 72° F. or above, and the plants thoroughly dusted with finely divided sulphur dust aiming to cover lightly the lower as well as the upper surfaces of the leaves. The temperature should be kept at 72° F. for twelve hours a day for three days, when it may be reduced to normal. At the end of seven days examination will show whether new infections are taking place; if they are the operation must be repeated. No wetting of the foliage should take place once the sulphur has been applied, nor should sulphuring take place on spikes just opening or else the petals will be scorched.

DISCUSSION.

It will be seen that the complete life history of this rust is not yet known. The germination of the teleutospores results in the production of basidiospores which will not infect the Antirrhinum, and this points to the existence of the æcidial stage on some alternate host not yet discovered. The important fact which concerns us at present is that in favourable localities the fungus can overwinter on diseased plants, and will produce uredospores as soon as conditions are suitable. Specimens have been received in the Laboratory from many areas, in some cases they bore almost all uredospores, and some others almost all teleutospores. The uredospore stage (usually considered a summer spore stage) is said to occur at all times on diseased plants, and this is borne out by our observations for abundant uredospores have been observed on outdoor plants at the end of October. being far more abundant than teleutospores even after frosts. America the view is held that most infection is carried on by uredospores in the glasshouses used so extensively in that country for cut flower production, but even there uredospores have been collected from outdoor plants in January.

The optimum temperature of 50° F. would be met with fairly early in the summer, even in Great Britain, but the overwintering of the rust could probably only take place in the southern counties.

The question as to how the disease came to Great Britain has been considered, but as yet no satisfactory explanation has been found. It seems safe to assume that the only import of Antirrhinums to this country is in the form of seed, but it also seems definitely established by American workers that Antirrhinum rust cannot be transmitted by the seed. As already mentioned one specimen received in the Laboratory had disease pustules present on the seed pods. Peltier also mentions this occasional rusting of the seed pods, but he failed to obtain disease from seed harvested from diseased pods. The seed coat is very rough and contains surface crevices which could harbour many spores, but here we are faced with the fact that the uredospores cannot survive six weeks' drying and the teleutospores, even if germi-



Fig. 73.—Antirrhinum Rust (Puccinia Antirrhini).



Fig. 74.—Antirrhinum Rust (Puccinia~Antirrhini) attacking foliage, flower stem, and calyx.

nated, are incapable of infecting the Antirrhinum directly. In the writer's opinion, however, the possibility of uredospores coming to this country with the seed and still being capable of germination, cannot be entirely ruled out. There is no doubt that modern methods of rapid transport facilitate the spread of plant diseases. Nor is it impossible that teleutospores arriving in the autumn of 1932 could have germinated on an alternate host in this country. The teleutospores germinate best in December, and apparently require low temperature conditions prior to germination.

The first records were received from places in south-east England, but it has been impossible to narrow down the source of the outbreak. Seeds bought from many different sources have produced plants which have become diseased, and the way in which the disease was introduced is still obscure.

The question of the resistant character of some varieties has been examined by DORAN, who tested forty-six varieties and found great differences in susceptibility. Since then complete immunity is claimed for some varieties in California, and it is proposed to test some of these in the Laboratory at Wisley next spring.

CONTROL.

BUTLER'S advice on the control of Antirrhinum rust in the field and in the greenhouse has already been stated. The latter is a method easily carried out. The measures for control in the open depend on weather conditions, and it may be interesting to record the weather experienced in this country since the appearance of the disease in July.

At Wisley, except upon two days in July, the maximum temperature each day in July, August and the first week of September was above 68° F., but the mean was considerably below this. The mean daily temperatures were below 68° F. on 20 days in July, 21 days in August, and throughout September. The temperature was above 72° F. for more than 8 hours daily on only 12 days in July, 12 in August and 2 in the first week of September, and from this it will be seen that, even in so hot a summer as that of 1933, Butler's condition for good control by sulphuring (viz. more than 50 per cent. of the days must give over 8 hours at 72° F. daily) was not fulfilled. Even in a fine summer in this country it seems probable that control would not be effected by sulphur-dusting. If the disease persists the most promising means of combating it would be the breeding of resistant or immune varieties.

It now remains to be seen whether the disease can overwinter in this country. As seen from the foregoing data two possible ways in which this may happen are:—

- (1) The disease may overwinter on rusted plants in favourable localities or even in some greenhouses or frames.
- (2) An alternate host may exist in England and be infected by the teleutospores.

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The more probable method is (I), and for this reason it is urgently necessary that, if possible, both healthy and diseased Antirrhinum plants in localities where the disease has occurred be destroyed by burning. As an additional precaution it would be as well to follow the method advised by the Ministry of Agriculture for the treatment of soil in contaminated beds. This is to water or spray the surface of such soil with a solution of copper sulphate (bluestone), I lb. dissolved in 10 gallons of water. In gardens where the disease has appeared, no Antirrhinum plants whatever should be kept over the winter either as plants or cuttings.

The author's thanks are due to Dr. G. H. PETHYBRIDGE of the Ministry of Agriculture Plant Pathological Laboratory, Harpenden, for advice and references to literature, and to Mr. F. C. Brown, Wisley, for taking the photographs.

OTTO STAPF, Ph.D., F.R.S., F.L.S., V.M.H. (1857–1933).

THE late Dr. STAPF, formerly Keeper of the Herbarium and Library of the Royal Botanic Gardens, Kew, was probably known to only a few Fellows of the Royal Horticultural Society before he became Editor of the Botanical Magazine and Hon. Editor of the Index Londinensis, when these two important undertakings were assumed by the Royal Horticultural Society.

When STAPF retired from his post at Kew, on reaching the age limit of sixty-five in the year 1922, he was invited by the Council of the Royal Horticultural Society to undertake the editorship of the Botanical Magazine, and the high standard which the magazine has reached under his devoted direction is ample proof of the wisdom of the Council's choice. He was actively engaged on the magazine work for the October number until he left Kew for his holiday in Austria, towards the end of July, and the news of his unexpected death on August 4 came as a great shock to his many botanical and horticultural friends and colleagues.

All STAPF's work was characterized by great thoroughness, especially in matters connected with the plants figured in the Botanical Magazine. His determinations of the plants were verified, whenever possible, by comparison with the types or with authenticated material, and added to this he utilized to the full the resources of the Kew Library which he knew so thoroughly. His extensive bibliographical knowledge, covering both the ancient and the modern botanical writers, and his interest in questions of geographical distribution enabled him to accompany his descriptions of the plants figured with notes of great scientific interest and value. The account of the plants concerned in the history of the origin of the cultivated Chrysanthemum in the last part (October 1933) of the Botanical Magazine is a good example of his erudition and of the trouble he always took in dealing with the plants to be illustrated. The qualities which fitted him so well for the Botanical Magazine work made him an ideal editor of the Index Londinensis, a work of world-wide usefulness which will be a permanent monument to his great knowledge and mastery of detail.

Though STAPF had been for so long a Herbarium botanist, this did not mean that his interests were confined merely to the dried plants. On the contrary he was a keen naturalist, taking a very lively interest in living plants, both wild and cultivated, and, as many Fellows whose gardens he may have visited will remember, he was a companion any keen gardener would welcome and from whose visit a fund of interesting information would be derived.

By his death botanical and horticultural science has lost a great botanist, and his friends and colleagues one who could share fully their interests in garden plants both new and old.

Otto Stapf was born on March 23, 1857, at Ischl, Austria, his father, Joseph Stapf, being Oberbergrat of that town. Some two years later his family moved to Hallstadt, where his father was in charge of the salt springs which feed the famous baths at Ischl, and here his boyhood was spent. He commenced his botanical studies at Vienna under Professor Wiesner, obtaining the degree of Ph.D., and in 1882 he was appointed Assistant to Professor Kerner von Marilaun, the well-known author of Pflanzenleben (The Natural History of Plants, translated by Prof. F. W. Oliver).

It was about this time, and particularly in the year 1885, that he travelled in Persia and made notable collections which he worked out together with other Persian collections, and published a series of papers dealing with the vegetation of the Orient. His two most important papers were the results of the Polak expedition to Persia in 1882 and a revision of the genus Ephedra, a genus which continued to interest him all his life and on which he was the recognized authority.

It was in the year 1890 that he was invited to come to Kew as Assistant for India by Sir W. Thiselton-Dyer, and he commenced his work in that position in January 1891. From then onwards he made England his home, quickly ingratiating himself with his colleagues, and equally quickly being fully appreciated for the soundness and thoroughness of his botanical work.

STAPF assisted Sir Joseph Hooker, no mean judge of a man's ability, in working out the grasses for the Flora of British India, and in a letter referring to Stapf's work on the difficult genus Poa, Sir Joseph wrote: "After carefully revising his work I do not think it could be better done."

STAPF was appointed Principal Assistant in the Herbarium in 1899, and in 1909, on the retirement of Dr. W. B. Hemsley, he succeeded to the distinguished post of Keeper of the Herbarium and Library.

Those who had the good fortune to work under STAPF's guidance at Kew owe very much to the kindly interest he took in their progress, especially so in the case of the junior members of the staff, and to the fine example of thoroughness in research in systematic botany which he set them. This is not the place to enter into details of his systematic work; suffice it to say that he had a world-wide reputation for his knowledge of the grasses, especially those of India and of South and Tropical Africa. He was also the recognized authority on the genus Aconitum. It is of interest to mention that he first suggested that Spartina Townsendii, the 'Rice grass,' which has colonized Southampton Water and other mud flats on the south coast, was of hybrid origin—a suggestion which has recently been confirmed cytologically by Huskins.

STAPF was elected a Fellow of the Royal Society in 1908, a fitting recognition of his high attainments and of his great services to botany.



Fig. 75.—Dr. Otto Stapf, F.R.S., F.L.S., V.M.H.

[To face p. 128.



He had been elected a Fellow of the Linnean Society in 1902, having been an Associate since 1898, while during the years 1908–16 he served as Botanical Secretary. In the year 1927 he was awarded the Linnean Gold Medal. A foreign distinction he greatly prized was the Hon. Membership of the Deutsche Botanische Gesellschaft, conferred upon him in 1932. He was also a Corresponding Member of the Vienna Academy of Sciences. The appreciation of his work for horticulture was marked by the award of the V.M.H. in 1927, following very appropriately the lecture he gave before the Society on the History and Mission of the Botanical Magazine in 1925, which was published in the Journal of the Royal Horticultural Society, vol. 51 (1926).

His other great service to botany and horticulture, after his retirement from Kew, was his editing of the Index Londinensis for the Society. This monumental work in six volumes includes references to all plates and figures of flowering plants and ferns published from 1753 to 1920 inclusive. The work was planned by STAPF and carried out under his constant supervision; it should be noted that the cross-references, which add so greatly to its value, could only have been made by a systematic botanist of wide experience. Then, too, his knowledge of so many languages was of the greatest service in dealing with questions of nomenclature, orthography, etc., which constantly arose during the progress of the work. His grasp of detail, power of generalization and of adequately organizing his staff were the factors which enabled him to plan and carry through the whole work to a successful conclusion; for the magnitude and difficulty of the vast undertaking can be realized only by those engaged upon or in close connexion with the task.

As with his other activities and interests, STAPF was always ready, however busy he might be, to give help and advice to the members of his staff. Needless to say, the completion of the Index gave him great pleasure, and, realizing fully the practical value of the work, he was a keen advocate of its continuation by periodical supplements—a policy which it is hoped will be followed by the Society.

The value of the Index is being increasingly appreciated by botanists and horticulturists; for in the past a long search was often needed before a figure of a particular plant could be found: now, however, thanks to the chronological arrangement adopted, not only can the best figure of a species be found at once, but its botanical and horticultural history can be traced from the time of Linnaeus onwards.

On completion of the publication of the Index Londinensis the Royal Horticultural Society awarded him the Gold Veitch Memorial Medal.

STAPF, though always a most loyal and devoted British subject, retained a deep love for his Austrian home where he had so many friends and relatives, and though we deeply mourn his loss, his death in his own land was what one feels he would have desired. It should not be forgotten how difficult a time he had during the war, when he was not always received with the kindness he so fully deserved, and

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when his feelings must often have been so sorely strained, since his relatives and friends were reckoned among our enemies. Throughout all those trying years STAPF was unfailing in his loyal service to Great Britain.

To those who knew him well he was the kindliest of men, with a keen interest in literature and art and with all the instincts of a true naturalist. With all his learning he was the most modest of men, wonderfully patient and never sparing himself when he could help others.

Science has lost in STAPF a man of ripe experience and wide knowledge, and his more intimate associates a staunch colleague and a true friend.

An account of STAPF's scientific publications will be found in the Kew Bulletin. See also Journal of Botany, vol. 71 (October 1933), pp. 296-299.

A. W. H.

1827-1927

PORTRAITS AND BIOGRAPHICAL NOTES OF EMINENT BOTANISTS AND HORTICULTURISTS

THE ROYAL HORTICULTURAL SOCIETY desires to draw your attention to the companion volume to *Curtis's Botanical Magazine*, entitled

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COMPILED BY

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THE AWARD OF GARDEN MERIT.-XXIII.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

165. Sternbergia lutea.

Award of Garden Merit, November 12, 1928.

There is about some flowers an air of breeding that at once lifts them out of the common ruck and gives their a distinguished place in the gardens of all who appreciate refined and finished beauty. Sternbergia sicula angustifolia is one of them, and it is surprising that it is so little grown. Possibly a little-deserved reputation for tenderness is answerable for this neglect and for the cosseting that is meted out to it in the gardens of some who know and value it. At any rate, if planted in a sunny spot in well-drained soil in the south of England one need not greatly fear its loss.

In general appearance (though it belongs to a different family) it bears a resemblance to a very refined though rather large yellow Crocus. The Italians indeed call it *Zafferano giallo*, thus recognizing the likeness. The yellow is very clear and glossy, deep and bright, and without markings to detract from its purity; the stamens too are yellow, both before and after they burst. The flower, borne singly on its somewhat flattened stem, stands about 4 inches high, just above the narrow shining deep green leaves which appear with the flowers and which are about 3-4 inches long at flowering time, lengthening later.

S. lutea is a native of Southern Europe from S. France to Asia Minor, and N. Africa, growing in stony places, on rocks and walls and much more rarely in woods. It was introduced to cultivation in England before the end of the sixteenth century, and it is surprising that it is not better known and more grown than it is. There is an excellent figure in Sibthorp's Flora Graeca at t. 310, and one not quite so typical in the Botanical Magazine, t. 200.

166. Anemone Hepatica.

Award of Garden Merit, June 1, 1931.

The Hepaticas, as they are often called, are so distinct in appearance from the usual conception of an Anemone that they have from time to time been made into a separate genus; and in books and catalogues one may find them arranged either under Anemone or Hepatica. We

* The notes on the first hundred plants to receive the Award of Garden Merit have been collected from our JOURNAL, vols. 47 to 53, and published as a pamphlet, price is. For subsequent notes see vol. 54, pp. 218 and 423; 55, pp. 121 and 276; 56, pp. 80 and 245; 57, pp. 65 and 354; and 58, pp. 171 and 400.

prefer to regard the group as part of the genus Anemone, and to call its most widely grown member Anemone Hepatica instead of Hepatica triloba. In most Anemones there is a ring of green leaves (the involucre) on the flower stalk some distance below the flower, but in A. Hepatica these leaves are close beneath the flower, separated from it by only a very short pedicel, and it is upon this that the distinction between Hepatica and Anemone mainly rests. There is a plant in Kashmir woods, however, obviously nearly related to A. Hepatica, where there is a ½-inch stalk to the flower above the involucre, and the line of separation into distinct genera is therefore broken by A. Falconeri, as the plant is called.

- A. Hepatica likes a deep, moist loam with plenty of leaf soil, and it dislikes disturbance. Semi-shade suits it, and as it comes in very early spring and flowers before its leaves appear, planting near deciduous shrubs should suit it well. It is at its best when a mild spell succeeds a rather hard winter, for then the flowers open nearly all together with wonderful effect. There are white, ashy, red, pink, and purple single forms with flowers an inch across, and there are double ones. Later the usually three-lobed leaves appear, and as these vary in form different species have been distinguished. A form from Central America with unlobed leaves (A. integrifolia) does not appear to be in cultivation, but A. acutiloba with ovate acute lobes and A. americana (of the Botanical Register, t. 387), both from the Eastern United States, are usually regarded as varieties of A. Hepatica. A. angulosa, however, is more distinct, and has 3 to 5-lobed leaves which are often toothed as are the leaves of the involucre. Like A. Hepatica, this has white, blue, and reddish varieties. A. angulosa is better known in gardens than in the wild, for it occurs wild only in the Siebenburg, whereas A. Hepatica is widely distributed in Europe and N. America.
- A. Hepatica was one of the earliest plants to be figured in the Botanical Magazine, where there is a good picture in t. 10, vol. 1.

167. HYACINTHUS AMETHYSTINUS. Award of Garden Merit, July 27, 1931.

Several Awards of Garden Merit have fallen to spring-flowering bulbs, and there is little cause to wonder that this should be, and this addition can certainly hold its place among that beautiful company.

The generic name gives one a general picture of the plant with its narrow green leaves, 6 or 7 of them, rising in a tuft from the earth, and from the middle of the tuft an erect stem about 9 inches long bearing a number (perhaps ten or a dozen) of rather tubular flowers, flared at the mouth, spaced apart, each about ½-inch long, and nodding somewhat on their short stalks—not stiff and formal like the florist's hyacinth, but with a charming grace. But the specific name does not help to complete that picture, for the flowers are not amethyst but a shade of clear blue—best called sky-blue possibly, but the soft blue of an English sky—and there are very few flowers of the same tint.

Possibly when he chose the name LINNAEUS had not seen the living plant.

Ordinary good garden soil suits it, but it should not be too dry, and certainly not constantly moist. The bulbs, about the size of an olive, should be planted four or five inches deep in September, and the flowers will come in May or early June, and there it may be left.

It is not, I think, a plant for massing as one may mass the bluebell or the grape hyacinth, but rather calls for a place where one may see the grace and beauty of the individual; so rather wide planting with worthy companions on a quiet border for such things, or in a nook of the rock garden, should suit it; and what more delightful companion for it than *Narcissus juncifolius* that grows with it in its Pyrenean home, and calls for the same treatment.

H. amethystimus grows not only in moist pastures of the Central Pyrenees where it is sometimes abundant, but also in some other parts of north-east Spain, in Bosnia and Croatia, and may attain to an altitude of 5000 ft. It is perfectly hardy, but like some other hardy and beautiful plants, and quite as unaccountably, has never become really common in English gardens although introduced long ago. Philip Miller grew it in 1759 in the Chelsea Physic Garden, and then it seems to have been lost until Sabine, Secretary of the Horticultural Society, flowered it in May 1819, and it was figured in the Botanical Register, t. 398, and a few years after (from plants again grown at Chelsea) in the Botanical Magazine, t. 2425.

168. Anemone pavonina 'St. Bavo.' Award of Garden Merit, May 9, 1927.

There is growing wild in Greece a brilliant race of Anemones with broad sepals of a rather deep but bright red scarcely rivalled by any other spring flower, and when growing in numbers as they grow there making a gorgeous spectacle. These wild plants are not without variety in their colouring, as Mr. R. D. TROTTER tells me, for he found the red form more abundant on flat ground in full sun, whereas in the shady side of sloping banks of streams where vegetation is lush a fine purple variety grows. The best flowers with longest stalks are found among low scrub in full sun. When they are brought into cultivation variation seems to be increased, and after due selection a race of great beauty may be secured. Such a race is the one called 'St. Bavo,' raised and selected from the purple form almost beneath the shadow of Haarlem's great cathedral, whence it takes its name. In this strain many delicate shades of colour between white and red are found-creams and salmons and many shades of purple among them; and their large single flowers—for they are single; not the heavy, curious double form often called 'pavonina'—when the plants are grown well make a beautiful group in the border from March to May. If they can be induced to stay more or less where they are put, they are excellent for cutting provided one remembers they need a

little time in the house to become effective, for they are among the flowers that respond to differences of temperature by opening and closing with its variations. The flowers when open are two or three inches across, and they are held above the rather divided foliage which forms an effective foil for their symmetrical beauty.

The plants like lime, and sun, and good drainage, but the soil should be fairly moist. If, however, the foliage is killed by autumn frost, flowering in the succeeding spring is sparse and a sheltered place should therefore be found for them. They are excellent in pots or in a cold frame. They transplant better when small, and small roots or seedlings give better results as a rule than older ones, so long as they are planted in early July. The tubers travel well when quite dry, but it is better that they should be out of the ground only a short time. They are easily raised from seed, which they produce freely.

169. CERATOSTIGMA WILLMOTTIANUM. Award of Garden Merit, November 12, 1928.

WILSON found Ceratostigma Willmottianum in the dry country of the Min River Valley in W. Szechwan, and Miss WILLMOTT raised two plants from the seed he sent home, and from these plants the plants in cultivation have been derived. Wilson tells us that in Mupin it grows with Sophora viciifolia, Bauhinia sp., Rosa Soulieana, a species of Ligustrum, Koelreuteria apiculata, Incarvillea variabilis, and Amphicome arguta.

C. Willmottianum is a useful shrub (which in all but the warmer parts of the country may be killed to the ground every winter) for its season of flowering, which is July until frost comes, as well as for the colour of its flowers-bright blue.

It grows about 2 feet (or in rich soil up to about 4 feet) in height and freely shoots from the base, so that it may, in time, make a clump of considerable size. The flowers are in clusters at the ends of branches. closely packed but opening in succession, so that the spreading lobes are never cramped, nor do the heads contain at any time more than a few open flowers. On the other hand, the flowering is continuous through the autumn and, in the sunny, well-drained place the plant demands, it forms for months a very pleasant picture, worth even the place near a sheltering wall, reserved for good plants. The plant is leafless in winter.

There is a coloured plate of it in the Botanical Magazine, t. 8591.

170. CAMPANULA LACTIFLORA.

Award of Garden Merit, December 13, 1926.

Campanula lactiflora is a native of the Caucasus and was introduced in 1814. It is a tall-growing herbaceous perennial with sharplytoothed, stalkless, nettle-shaped leaves about 4 inches long. By the end of June it reaches a height of six feet or more (though some varieties appear to be dwarf), and then the great loose panicles open their beautiful blossoms almost all at once, and for a fortnight or more the plants are a glorious sight. The flowers are deeply-lobed bells, over an inch across, carried erect. They are produced in threes on short stalks in clusters often 15 or 18 inches long and 10 inches across. The typical form is milky blue; but there is a very beautiful white one, sometimes with a faint trace of blue in the white, and a blue one. These forms when growing together do not come true from seed, and plants which are especially good may easily be increased by division. There is no need to resort to division, however, where numbers only are desired, for seed is produced in extraordinary abundance, and if allowed to ripen may result in so many seedlings as to become a nuisance, albeit a beautiful one. It is, therefore, best to cut off the flower heads as soon as the flowers are past.

Miss Jekyll had a way with this and some other herbaceous border plants of cutting them down to 18 inches or so about the end of May, so that they were induced to branch and flower later at a moderate height. Thus she prolonged the flowering season and made the plant suitable for a greater range of places in the border. This was a lesson learned from adversity, for she observed and profited by the behaviour of plants which rabbits had attacked!

Not only is *C. lactiflora* a good border plant, but it is excellent for wild gardening, and on the long border at the north side of the nut hedge at Wisley, where flowers of one sort or another are to be found the year through, it forms a very charming feature. It has grown there for at least twenty years without replanting and without manuring, and never fails to flower abundantly.

In the grass, too, it is thoroughly at home, sometimes overtopping a man's head, and it is a plant better than most for semi-shady places.

In spite of the fact that Boissier corrected the mistake he made in calling a specimen of this plant *C. celtidifolia*, that name still persists in catalogues. It ought to be dropped entirely, for *C. celtidifolia* is nothing but *C. lactiflora*, the latter being the original and proper name for the plant.

There is a good figure of *C. lactiflora* in the Botanical Register, t. 241, and one in the Botanical Magazine, t. 1973.

171. ARUNDINARIA NITIDA.

Award of Garden Merit, February 10, 1930.

Considering their distinctive appearance, the beauty and grace of many of them, and their value in borders and woodland and sometimes as isolated plants, the larger grasses are far less often seen in English gardens than might be expected. A considerable list might be made of species worthy of a place where space permits and of several that should be found in all large herbaceous borders.

The most important group, however, the bamboos, are unsuited for this part of the garden, and are perhaps best fitted for a woodland

dell, where the soil is moist and well supplied with humus, where there is some overhead shade, and some shelter from the driest and coldest winds. In this kind of place over the greater part of the British Isles, at least, some species of these grasses with woody stems might be planted. It is possibly unfortunate that the hardiest of them, Arundinaria japonica (Bambusa Metake) is one of the least graceful, for it is the one most often seen and perhaps recommends the group less strongly than the sight of well-grown plants of such species as the lovely A. spathiflora in the south-west of England or A. nitida would do. Yet A. nitida is nearly as hardy, and, given the conditions outlined, hardy enough for any garden except the very coldest. It is perfectly hardy at Wisley, and as all who know Wisley know the climate there is by no means mild. The main drawback of bamboos in the garden is the shabbiness of the foliage in spring. Even the hardiest are apt to look shabby until the new leaves are produced at the end of May or later, since in many instances either the foliage is entirely lost or it becomes dry and of a not very pleasing shade. In mild winters at Wisley A. nitida has proved evergreen, though it loses perhaps half its leaves and sometimes all of them, but its stems have not been seriously injured. In these disabilities it is no worse than A. japonica or A. palmata, in grace it is far superior to both, and it is furthermore of a tufted instead of a travelling habit, in other words, it does not spread at an unduly rapid rate as does A. palmata, the stems of which may come up a yard or so from the edge of the clump.

The stems of A. nitida are about 10 feet long, and save for a few leaves near the apex are leafless in the first year. The round stems distinguish this as an Arundinaria from Phyllostachys, in which the stems are flattened above the nodes, and their purple-black colour distinguishes it from all other species of Arundinaria. In the second year leafy branches are produced to the number of ten or more from every node almost simultaneously, and each branch bears about four narrow leaves from 2 to $3\frac{1}{2}$ inches long, very shortly stalked, bright green above and somewhat grey beneath, with minute bristles on the margin on one side. When the foliage is developed the tops of the stems arch over very gracefully, and to this a great deal of the charm of this bamboo is to be attributed, and because of it the clumps show their beauty best when somewhat isolated, although a walk lined with this species can be very beautiful, especially from the end of May to Christmas.

A. nitida is a native of Central and Western China, whence it came to England by way of St. Petersburg in 1889. It is sometimes still listed in catalogues under the name A. khasiana, but that name properly belongs to a distinct species from the Khasia Hills less hardy than A. nitida with the leaves less tessellated, the stems annual, and less definitely purple-black.

Of all bamboos this, except in the mildest parts of our islands, is the most worth planting, for it stands out in hardiness, grace, and tidy habit.

172. DAPHNE CNEORUM.

Award of Garden Merit, May 9, 1927.

Nearly all the Daphnes are worthy of a place in gardens, but many of them are difficult to suit (perhaps because we do not know exactly what soil to give them), some because they are tender, many because few of the genus like to have their roots broken and so are difficult to transplant, and some because exposure to sun results in the cracking of the bark and that, as in some Rhododendrons, in Fremontia californica, and in some other plants, is fatal. Daphne Cneorum is one of the easiest, though sometimes even that will die without apparent cause, but usually it will thrive in a mixture of loam, peat or leaf soil, and limestone, and sometimes without limestone. It seems to grow best where it can thrust its roots down to moisture through the chinks of rocks and there, even in fullest sun, and in such heat as, for instance, in exposed places near New York where it is an excellent and happy limestone rock plant, as well as in the cooler climate of our own gardens, it will make a low spreading shrub, sometimes as much as a yard across, every one of its branches densely set with persistent, deep green narrow leaves, wider near the wedge-shaped apex than towards the stalks, and in May and June, if it is happy, most of the branches ending in a dense corymb of rosy pink flowers, so closely placed as almost to hide the foliage. The individual flowers are less than half an inch across, but so numerous that a plant in flower is conspicuous a long way off, and so sweetly fragrant that it is a plant as fit for a blind man's garden as for every other. It will do no harm, but probable good, to place stones on the trailing stems, and it calls for no other care.

Be prepared though, one day when you are convinced the plant has settled down for the next century or so and is flourishing as only a plant well placed can flourish, to see it flag and die. Preparation is not difficult, for it is readily propagated by cuttings in the sand frame, and these transplant quite readily while they are young.

- D. Cneorum is a native of Central and Southern Europe on limestone hills in the Jura and in the Southern Alps and the Pyrenees, and it varies to a considerable extent in habit and in the size of the flowers as well as in colour. There is a white variety, D. Cneorum alba; and D. Verlotii, found in the Dauphiny and in Bavaria, is closely related, with rather larger but sparser flowers and longer, narrower leaves. D. striata is not unlike D. Cneorum, but it is less good and far less often seen in gardens, though abundant and widely distributed on many types of rock in the Alps of Central Europe. If it were not for D. Cneorum, D. striata with lilac-pink flowers would be more highly thought of no doubt. It is readily distinguished by its perfectly smooth instead of downy stems and buds.
- D. Cneorum has been in cultivation for many years, and is figured in the Botanical Magazine, t. 313.

173. Berberis Thunbergii atropurpurea.

Award of Garden Merit, July 25, 1932.

Possibly the best Barberry for autumn colour of foliage and berry combined is the Japanese Berberis Thunbergii, which has been in our gardens for sixty years. It is a neat, prickly small bush, compact in growth and free-flowering, but not very noticeable when in flower though the yellow flowers have a tinge of red. In autumn though, there is no more brilliant bush in the garden and none more consistent in the brilliancy of their colouring. It is a shrub as fit for the small garden as the large, for it rarely in this country grows more than four feet high or through, although it may in countries with warmer summers attain eight feet. Its small entire leaves set in crowded tufts along the branches are deciduous and the shrub is perfectly hardy and in no way particular as to soil. It thrives equally on chalky and on peaty soils, in clay and in sand. It has been planted (like Spiraea Van Houttei) so abundantly, often as a hedge plant, in Canada and the Eastern States as to be almost too often met with, like privet in England, but might well be more often grown here than it is. The variety to which the Award of Garden Merit is now given possesses the one useful attribute that the type lacks. While B. Thunbergii does not make itself in any way conspicuous save in autumn, the variety atropurpurea, which is of recent origin, but sufficiently abundant to be easily obtained, adds colour to the garden from spring onwards and falls in no way behind its parent in beauty in the dying year. The parent species, B. Thunbergii, has already received an Award of Garden Merit (see JOURNAL R.H.S. 53, p. 329).

174. CAMPANULA BELLARDII MIRANDA. Award of Garden Merit, December 8, 1925.

REGINALD FARRER found this plant "under the slopes of the Vorder Wellhorn . . . a really astonishing C. Bellardii, very dwarf, with flowers of enormous size, and of a delicate pallor which might almost deserve the name of silvery, were it not more feelingly to be painted as a diaphanous and pale china-blue, like a fine cloud at night with the moon behind it." Transferred to his Ingleborough garden, after many days and the fear that it was lost, it proved "prodigiously free in growth, and prodigiously free, from summer right away through autumn, with those comely pale bells, no longer carried, however, on such dwarf stems, but in taller spraying showers, even when all the other Bellardiis are over and done." We cannot improve on this description, and merely remark that "enormous" means that the short wide open bells are about half an inch deep, and that "taller" infers the height to be about two inches. FARRER's prophecy in The English Rock-Garden, whence these quotations come, that this "is going to be one of the greatest of our rock-garden plants" is fulfilled to-day, and none who has chinks between stones to fill need

hesitate to plant it. It will run freely yet never be a nuisance and from July onwards it will be a joy to behold. *C. Bellardii* in all its forms, and it is one of the most abundant of alpine Campanulas, is worth a place in gardens and seldom proves unhappy where it can get its roots into shingly compost, and of its many forms none is more worthy than this.

We have retained Farrer's name—C. Bellardii—for this plant, which is often called C. pusilla and is possibly a form of C. cochlearifolia. There is also confusion in gardens and catalogues with C. caespitosa, which is a distinct plant. C. Bellardii was a name given by Allioni in 1785 to a plant collected by Bellardi at the top of l'Autaret, and many Continental botanists regard it as a variety of the C. cochlearifolia of Lamarck's Encyclopaedia (1783) (= C. pusilla, Haenke, 1787), and this is probably the correct name. Farrer seems to have transposed the specific and varietal names, for he speaks of C. Bellardii var. cochlearifolia.

175. Monarda didyma 'Cambridge Scarlet.' Award of Garden Merit, August 27, 1928.

The names of two men ever to be held in honour in British horticulture are called to mind by this plant, J. Bartram, of Philadelphia, who collected the seed, and Peter Collinson, the English merchant to whom he sent it and who raised and flowered it in his gardens at Peckham, and no doubt later at Mill Hill, where he removed in 1749. Collinson's note says: "Monarda floribus coccineis, caule obtusa. Oswego Tea. Mem. The Leonurus of Cornutius (now Monarda) raised 1744; this charming plant flowered the first time in England, in 1745 and 1746, is now, 1760, plenty in Covent Garden Market, was lost in our gardens. J. Bartram gathered it at Oswego on Lake Ontario from whence it is called Oswego Tea by the people of New York; it is not unpleasant."

As Dillwyn pointed out long ago, the reference to Cornutius and "caule obtusa" are errors. The plant is perennial and herbaceous, has, like the rest of its family, opposite leaves, and produces numerous red flowers, shaped like those of a dead nettle, in clusters in the axils of its upper leaves, which are themselves tinged red. The sharp angles of the stem help to distinguish this species from the generally more magenta M. fistulosa, which has the stem-angles rounded. The plant is perfectly hardy and very useful in flowering from July to September. The pleasant scent of its foliage has given the common name "Beebalm," and though they may think the leaves "not unpleasant" as a tea, most people will more cordially appreciate their fragrance in the garden.

Seedlings vary in the shade of their flowers, and in the variety to which the Award is given they are bright scarlet.

Like Geum 'Mrs. Bradshaw,' Lychnis chalcedonica, and other plants with bright scarlet flowers, this needs care in choice of companions in the border, but it is a plant which will thrive in light woodland, where

a drift of it would look delightful, and is worth trying on the edge of water, for it likes a moist root run, such as it enjoys in its native places, and will light up semi-shade in a cheerful fashion. Wild in moist woods by streams in Eastern Canada, and in the Eastern States as far south as Georgia, it is no stranger to extremes of temperature, and in a moist soil it will give an excellent account of itself in any garden in the British Isles. It is figured in the Botanical Magazine, t. 546.

176. CIMICIFUGA SIMPLEX.

Award of Garden Merit, May 9, 1932.

This is another herbaceous perennial for a moist soil, and one well supplied with leaf soil will suit it best. It makes a comely clump of divided rather light green foliage, from amidst which the long unbranched, or almost unbranched, spikes closely set for eighteen inches or so with creamy flowers arise in September. It needs much the same conditions as Monarda didyma and would look well planted with it, though it flowers rather later than Monarda.

Cimicifuga simplex comes from Kamchatka, and is probably distributed fairly widely through Japan and Eastern Asia. a representative in N. America in C. racemosa with branched inflorescences, also a very good garden plant, and in Europe in C. foetida, which is however not nearly so good a garden plant, with usually shorter inflorescences and flowers much less clean-looking.

C. simplex may be readily increased by division, or raised from seed.

177. CERCIS SILIQUASTRUM.

Award of Garden Merit, May 9, 1927.

Cercis Siliquastrum, the Judas-tree, flowers in May, and of all that great company in blossom then, it is one of the most beautiful, for the shade of its rosy-purple flowers is not only extremely pleasing but matched by few other plants; the whole tree is clothed with them, and since no leaves are yet developed the rosy tints of the billowy cloud, raised perhaps six feet or so above the earth, are undiluted with the green that is to come later. The tree can be made to produce a trunk but it is usually bushy and spreading and often not more than ten or twelve feet high. It is a tree for a sunny place, as might be expected from its habitat in Southern Europe and the East, where, as in Syria, it is common in rocky places. It is better fitted for the south of England than the north and likes a well-drained soil. It is at times a little difficult to establish, but when once settled down proves as hardy and as constant in its flowering as the best of the Japanese cherries. The smooth roundish-heartshaped leaves, about three inches across, are somewhat grey-green, and the pods, about four inches long. flat and thin, hang on the tree all the winter.

The tree, which has been in cultivation in England since at least GERARD's time, was figured in the Botanical Magazine at t. 1138.

STERILITY IN PLANTS.*

By Prof. R. Ruggles Gates, F.R.S.

In discussing sterilities in Lilies Dr. Stout mentioned polyploidy in the case of a plant of *Lilium tigrinum* recently discovered to be a triploid, as one of the sources of sterility; asexual reproduction both in *L. tigrinum* and *L. Hansoni*, where the individuals all belong to the same clon, and are not only self-sterile but inter-sterile; cases of specific sterility of quite a different sort; and finally, cases of true self-sterility where the condition is due to inhibition of pollen-tube growth.

The term self-sterility has had a very interesting history. It is something of a by-path in genetics, but nevertheless it is a very important field. The discovery of it apparently goes back to Kölreuter in the eighteenth century, who observed it in *Verbascum phoeniceum*.

DARWIN made various experiments on self-sterility in plants which are described in Animals and Plants under Domestication, and in papers of his on the cross-pollination of plants. That summarized the knowledge of his time. DARWIN concluded that in certain species at any rate, every individual plant was self-sterile, and on the other hand, that it was fertile with every other individual. That seemed to be an extraordinary situation and it still has no complete explanation.

Based on DARWIN'S work JOST put forward the theory of "individual Stoffe," an attempt to explain this condition in which every plant is self-sterile, but fertile to every other.

For a long time the position of self-sterility was somewhat chaotic and there was no analytical explanation. Self-sterility was known to exist in a good many genera, such as Reseda, Eschscholzia, Nicotiana, Petunia, Linaria, Brassica, Passiflora, and a number of others, in fact 175 species have been recognized as showing self-sterility and they belong to about fifty-five families scattered over the plant kingdom. The first analytical work on the subject was one by Corrent in 1912 on self-sterility in Cardamine pratensis. He crossed two plants that he called B and G, and obtained about fifty offspring. He tried other cross-tests and got sixty plants. As a result he found they fell into four groups of about fifteen each, which were interfertile and intra-sterile with each other. As an explanation he put forward the first genetical or Mendelian theory of the inheritance of self-sterility, that is that there were two factors, B and G, present;

^{*} This summary of existing knowledge on sterility in plants was presented before the Lily Conference at Vincent Square on July 13, 1933, following a paper on the subject by Dr. A. B. Stout as it applies to Lilies. The paper has been printed in the Lily Year-book for 1933 (pp. 152-171), and as this summary is of such wide interest it is printed here.

both might be present, both might be absent, or the plant might be heterozygous (hybrid) for one or the other. The explanation was not complete because individuals, which were b and g, in which both sterility factors were absent should be, according to the theory, fertile. which they are not.

There are certain other departures from the strictly Mendelian interpretation of these results. I think probably the most important work on self-sterility has been done by Professor East at Harvard with a species of Nicotiana. This work, begun during the war, has been carried on since, and has led to a clear point of view with regard to the inheritance and the nature of self-sterility in the tobaccos, and the same explanation has since been successfully applied to several other genera. East first crossed the species Nicotiana alata and N. Sanderae, and then he analysed the offspring. In the first instance he discovered three types of plants resulting from this cross. He recognized three sterility factors which he calls S1, S2 and S3. Resulting from crosses any one plant would be hybrid for any two of these factors; some were SIS2 and some SIS3. Further, he found that if a plant was SIS2, then it could only be successfully pollinated from a pollen tube carrying the factor S3. That is, it was self-sterile for pollen of the SI or the S2 type. In the same way for S2S3. This showed a very interesting situation and a clear interpretation of what happens. You get in these cases inhibition of growth of the pollen tube; the inhibition takes place when the sterility gene carried by the pollen tube is the same as one of the sterility genes carried by the style. Then you get slow growth of the pollen tube, and the growth is so slow that the flowers drop off before the pollen tube reaches the ovarv.

East interbred the descendants of this cross between the species of Nicotiana, and so found that there were these three groups of plants which were inter-fertile with each other and intra-sterile.

The work was then carried further and a larger number of sterility factors, or S-genes, was found, the number rising finally to fifteen S factors. East also tried the method of self-pollinating these self-sterile flowers by opening the buds and self-pollinating them, getting the pollen tube started down the style early, so that self-fertilization could then take place. In this way he was able to produce plants which were homozygous, or pure, for particular sterility factors. He got plants which were S2S2 by self-pollination in the bud. In the case of the S3 factor, plants which were homozygous for S3 were somewhat abnormal; they were dwarf and the leaves were curled. On the other hand plants which were homozygous for S3 and S1 were normal but somewhat weak. This is another indication that these sterility factors differ from each other. All of these fifteen factors he found were allelomorphic to each other, that is they are inherited as alternative to one another. You may have plants S7S10, S2S15, or any of these double combinations, but in nature no plant is homozygous for any one factor.

LEHMANN in Germany in 1926 arrived independently at the same point of view from a study of *Veronica syriaca*, but here the nature of the inhibition of the pollen tube growth is complete. He also found as many as seven sterility factors in the plants he studied, but he recognized that there are probably many more in the species as a whole.

These sterility factors differ among themselves and it is here that some are much stronger in their inhibitory effect on the pollen-tube growth than others, so that some are relatively border-line. This applies particularly to some of the Lilies. Under these conditions you may get a certain amount of fertilization from pollination of forms which are normally incompatible. This term "self-incompatible," by the way, was introduced by Dr. Stout in 1917, and of course it is a more exact term than self-sterility, which had previously been used.

Dr. Stout himself, in addition to studies on Lilies, has studied self-sterility in Chicory, and in Brassicas and Linaria, as well as in the Day-lily. His results, as you have seen, particularly in Lilies, but also in these others, show a great deal of variability in the manifestation of self-sterility. Probably the reason for this is, as I have mentioned, that some of these self-sterility factors, some of these S factors, are not very strong in their inhibition, so that you get a certain amount of fertilization resulting from pollination. In the case of Hemerocallis fulva, Dr. Stout showed that all the plants are intersterile with each other and that this is a clon, like Lilium Hansonii and L. tigrinum, and that it has been probably in cultivation in China for a thousand years.

These various sterility factors in Lilies and other plants affect the growth of the pollen tube in the style, and they affect it in different ways. In some cases you get an inhibition of the rate of pollen-tube growth beginning from the time of pollination; in certain cases you get a complete inhibition of germination on the stigma. In other cases the inhibition apparently only begins when the pollen tubes have reached the ovary.

More recent work has been done in drawing curves of rates of pollen-tube growth down the style of the plant. This physiological work is of very much interest, and recently in the Journal of Genetics for May 1933 is a paper on Self-sterility in Red Clover. Williams and Slow show that the same situation holds here—they found seven sterility factors in red clover which behave in this same fashion. During their experiments a factor for self-fertility arose, which leads to the condition in which the plants are self-fertile; apparently this arose as a mutation.

Professor East in his experiments on Nicotiana also found a self-fertility factor. And Dr. Stout in his paper on the Lilies mentioned that certain of these are self-fertile, apparently due to the presence of this self-fertility factor.

Probably not only this condition of self-fertility, but all of the self-sterility factors have originated from time to time as mutations;

apparently they are perpetuated because of the advantage of the heterozygous condition in the plant.

This gives in general a Mendelian interpretation of self-sterility which is applicable to a wide range of genera, and probably with further analytical studies of the Lilies themselves, the same sort of series of self-sterility factors may be found.

There is, however, one other condition which I ought to mention which appears to be of a different kind. Correns in 1928 published a paper on *Tolmica Menziesii*, in which the self-sterility was apparently of the same kind that Darwin found, where each plant is self-sterile but is fertile with every other plant in the species. He tested over a hundred plants and by inter-pollinating them and cross-pollinating them in every way he found that each plant, while it was self-sterile, was fertile with its own parents and with every sister plant.

This seems like a conception from the remarkable series of Mendelian factors for self-sterility in other species. Those who are working on this subject still attempt to show that possibly with further results it may be explainable on the same basis as the other cases, but up to the present, the only satisfactory explanation really is to fall back on DARWIN's conception which Jost called the theory of "individual Stoffe" as a basis of explanation.

Summing up, one would say that Dr. Stout's paper has emphasized a large number of different causes of sterility: self-sterility, or self-incompatibility being one; such diverse things as polyploidy and virus diseases being other causes of sterility.

PLANTS TO WHICH AWARDS HAVE BEEN MADE, 1933.

Acacia longifolia mucronata. A.M. April 4, 1933. From Messrs. Stuart Low, Bush Hill Park. A very ornamental flowering shrub. The leaves are reduced to lanceolate phyllodes three to four inches long, and the bright canary-vellow flowers are carried in spreading axillary spikes.

Achimenes 'Little Beauty.' A.M. July 4, 1933. From Messrs. L. R. Russell, Richmond. A very pretty hybrid Achimenes with erect, self-supporting growths. The soft, rosy-salmon colour of the inchwide flowers affords effective contrast to the dark, glossy green of the leaves and the purple tint of the stems.

Achimenes 'Minnie Rich.' A.M. August 15, 1933. From L. F. C. Rich, Esq., Northwood. The plant is about 18 inches in height and of neat habit. The dark green leaves are hairy and deeply veined. The stems and petioles are reddish; the rounded, funnel-shaped flowers are double, rosy-mauve, and measure 1½ inch across.

Aesculus indica. F.C.C. June 7, 1933. From the Royal Botanic Gardens, Kew. A handsome Indian tree allied to the common Horsechestnut. The massive leaves are composed of five to nine shortlystalked, obovate-lanceolate, finely-serrated leaflets. The flowers are white, the two posterior petals blotched with red and yellow, the lateral ones suffused with rose.

Astilbe koreana. A.M. June 27, 1933. From T. Hay, Esq., V.M.H., Hyde Park, W. A herbaceous plant about two feet in height with graceful, pinnate, fern-like foliage and arching panicles of feathery flowers which are at first rose-pink but creamy-white when fully open.

Azara Gilliesii. A.M. April 4, 1933. From the Donard Nursery Co., co. Down. An evergreen Chilean shrub. The very handsome leaves are broadly ovate, coarsely serrate, dark green with red stalks; from their axils arise elliptical racemes of minute flowers remarkable for their long and numerous orange stamens.

Begonia 'Allan Clarke.' A.M. May 23, 1933. A very large scarlet double tuberous-rooted variety.

Begonia 'Marjorie Porton.' A.M. May 23, 1933. A very large pure white double tuberous-rooted variety.

Begonia 'Winifred Arnoll Davis.' A.M. May 23, 1933. A tuberousrooted variety with large, bright yellow double flowers.

These Begonias were all from Messrs. Blackmore & Langdon, Bath. *Begonia (Tuberous-rooted) Fascination Strain. A.M. Aug. 18, 1933. Raised and sent by Messrs. Blackmore & Langdon, Bath. Plant 11-12 foot tall; flowers single, 5-6 inches diameter, margins

^{*} An asterisk means Award after trial at Wisley.

frilled, shades of pale yellow margins flushed red, and white centre margins flushed carmine-red.

*Begonia (Tuberous-rooted) Frilled Single Strain. A.M. Aug. 18, 1933. Raised and sent by Messrs. Blackmore & Langdon. Plant $\mathbf{1}_{4}^{1}-\mathbf{1}_{2}^{1}$ foot tall; flowers single, 6 inches diameter, margins frilled, comprising the following separate colours, which come true: white, yellow, rose, scarlet and crimson.

*Begonia (Tuberous-rooted) Single Strain. A.M. Aug. 18, 1933. Raised and sent by Messrs. Blackmore & Langdon. Plant 1\(\frac{1}{4}\)-1\(\frac{1}{2}\) foot tall; flowers single, 6 inches diameter, comprising the following separate colours, which come true: white, yellow, orange, pink, rose, orange-scarlet, crimson.

Beschorneria yuccoides. A.M. May 23, 1933. From Messrs. Hillier, Winchester. A striking Mexican plant requiring cool house treatment. The leathery, somewhat glaucous, lanceolate leaves are eighteen inches long and form a cluster from the centre of which the inflorescence rises; this is five or six feet tall, of a brilliant coral-red colour, and its pendent branches bear green, cylindrical flowers, each nearly three inches long, subtended by rose-coloured bracts.

Calceolaria hybrida 'Advance.' A.M. June 7, 1933. From Messrs. Dobbie, Edinburgh. The plant is 7 inches in height and bears, singly, large deep yellow flowers having a central streak of brown. The lanceolate leaves are deeply veined and measure $3\frac{1}{2}$ inches long by 1 inch broad. The parentage is C. polyrrhiza \times C. Banksii.

Camellia japonica 'Apple Blossom.' A.M. March 7, 1933. From E. M. Preston, Esq., Hayes. A very handsome single-flowered variety. The flowers are of good shape, pale blush-pink which deepens slightly towards the margins.

Campanula 'Brookside.' A.M. July 4, 1933. From the Brookside Nursery Co., Oxford. A very floriferous, dwarf plant stated to be a hybrid of *C. turbinata* and *C. Stansfieldii*. It is of spreading but not densely-tufted habit; the slender stems are clothed with ovatelanceolate, hairy leaves and each bears two or three widely expanded violet-blue flowers with pointed lobes.

Campanula excisa. A.M. June 27, 1933. From Dr. P. L. Giuseppi, Felixstowe. A delicately beautiful species well worth the care which is essential to its successful cultivation. It forms slender underground rhizomes from which it sends up numerous wiry stems clothed with narrow leaves and terminal flowers. Between the folded lobes of the bell-shaped, violet-blue blossoms are the small, round incisions that have given the species its name.

Campanula hercegovina. A.M. July 18, 1933. From Sir Wm. Lawrence, Bt., Burford. A dwarf, alpine species from Jugo-Slavia. The pot specimen exhibited had grown into a mass of slender, wiry stems bearing a few small, lanceolate leaves, which were almost hidden by the numerous prettily-shaped lilac flowers.

^{*} An asterisk means Award after trial at Wisley.

Campanula Poscharskyana. A.M. June 7, 1933. From Dr. P. L. Giuseppi. A free-flowering Dalmatian species of trailing and vigorous growth. The flowers are widely expanded, with pointed corolla-lobes, in colour lavender-blue.

Campanula saxatilis. A.M. June 7, 1933. From Dr. P. L. Giuseppi. A rare and beautiful plant for the alpine house. Its neat tuft of greyish-green, oblong-spathulate leaves forms a cushion from which spring the delicate sprays of cool blue, tubular flowers.

Campanula spathulata Giuseppii. A.M. June 7, 1933. From Dr. P. L. Giuseppi. A pretty little plant for the rock garden, of somewhat prostrate habit, with ovate leaves and spreading stems bearing widely expanded blue bells tipped with purple.

Campanula tubulosa. A.M. April 4, 1933. From Dr. P. L. Giuseppi. A species for the rock garden, with spreading shoots clothed with greygreen, oblong-spathulate leaves and bearing small, tubular flowers of light blue.

Carnation (Border) 'David Douglas.' A.M. July 18, 1933. From Mr. J. Douglas, Great Bookham. A flower of good form having a yellow ground heavily flaked with maroon-crimson.

Carnation (Border) 'Ettrick Dale.' A.M. July 18, 1933. From Mr. J. Douglas, Great Bookham. A large yellow variety of excellent shape.

Carnation 'Robert Allwood.' F.C.C. May 23, 1933. From Messrs. Allwood, Hayward's Heath. A scarlet perpetual-flowering variety of excellent form and having very full flowers with good calyces. A.M. February 7, 1933.

Catalpa bignonioides. A.M. August 1, 1933. From G. W. E. Loder, Esq., Ardingly. A well-known deciduous tree introduced from the United States of America in the early part of the eighteenth century. It has large, bright green leaves and flowers nearly two inches across, white, spotted with brownish-purple and lightly striped with yellow on the inside, arranged in broadly pyramidal panicles.

Catalpa ovata. A.M. August 1, 1933. From G.W. E. Loder, Esq. A very handsome Chinese tree with spreading branches bearing large, broadly ovate, dark green leaves, which are often three-lobed. The yellowish-white flowers are striped with orange and spotted with violet internally and are arranged in a pyramidal panicle ten inches long.

Ceanothus 'Delight.' A.M. May 9, 1933. From Messrs. Burkwood & Skipwith, Kingston-on-Thames. A hybrid raised from the cross C. papillosus \times C. rigidus. The dark blue flowers are borne in terminal and axillary racemes.

Chrysanthemum 'Harvest Moon.' A.M. August 1, 1933. From Mr. F. Woolman, Leicester. A bright yellow incurved variety of neat appearance. It is a sport from 'Autumn Gold.'

Chrysanthemum maximum 'Sunrise.' A.M. June 20, 1933. From Mr. H. P. Read, Norwich. A variety with large double white, Pyrethrum-like flowers with yellow discs.

Cnicus conspicuus. A.M. August 1, 1933. From C. Ingram, Esq. A very handsome Mexican Thistle, biennial in duration and only to be considered hardy in very sheltered situations. It is a sturdy, muchbranched plant with large pinnatifid, spiny-dentate leaves of rich, shining green. The flower-heads are elongated and bear two kinds of involucral bracts: the small, green, outer ones are spiny-margined and reflexed, the inner erect, lanceolate, of a beautiful orange-scarlet shaded with crimson.

*Dahlia. See p. 155.

Delphinium 'A. J. Moir.' A.M. June 7, 1933. From Messrs. Blackmore & Langdon, Bath. Fine bold spike; flowers large, double, 2 inches diameter, deep cornflower blue; eye white.

Delphinium Belladonna 'Elstead Blue.' A.M. August 15, 1933. From Mr. E. Ladhams, Elstead Nurseries, Godalming. Height 2½ feet; flowers deep blue; eye white, heavily flushed violet; long season of flowering.

Delphinium 'Sultan.' A.M. June 7, 1933. From Messrs. Blackmore & Langdon. Long slender spike; flowers very large, semi-double, 2 inches diameter, deep mauve-purple, outer petals flecked blue.

*Delphiniums. See also pp. 166 and xxxii.

Dianthus Allwoodii 'Ruth.' A.M. May 23, 1933. From Messrs. Allwood, Haywards Heath. The deep rose-pink flowers measure 2½ inches across and are semi-double with deeply serrated edges and a crimson zone around the centre. The plant is very free flowering in habit.

Dianthus 'Sutton's Freedom.' A.M. July 4, 1933. From Messrs. Sutton, Reading. This plant arose from a chance cross between Sweet William 'Sutton's Pink Beauty' Q and a Dianthus, probably D. superbus. Its height is about 2½ feet and the plant is perfectly hardy, flowering at the end of June and early in July. The leaves resemble those of a Sweet William, but are narrower and the stems more slender. The bright rose-pink, sweetly scented flowers are borne in a large head; each flower is fully one inch in diameter and the edges of the petals are rather more fringed than those of a Sweet William.

Dimorphotheca pinnata. A.M. July 4, 1933. From Messrs. Sutton. The flowers of this South African annual are buff-yellow with a satiny sheen. The weak branches give the plant a lax, spreading habit which should make it suitable for growing in hanging baskets.

Eremurus 'Dawn.' A.M. June 7, 1933. From F. C. Stern, Esq., Goring-by-Sea. A very fine variety of strong, vigorous growth. The unopened buds at the top of the raceme are rosy-pink, the open flowers a soft yellow suffused with rose.

Erica cinerea var. Eden Valley. A.M. August 1, 1933. From Miss G. Waterer, Long Rock, Cornwall. A very desirable wild variety of the common purple Heath. The flowers are mauve with white bases and are borne in the greatest abundance.

^{*} An asterisk means Award after trial at Wisley.

Erigeron hybridus 'Flame.' A.M. May 23, 1933. From Mr. E. Ladhams, Elstead. This very distinct plant is about 18 inches in height and bears flowers measuring $\mathbf{1}_{\frac{1}{2}}$ inch across. The ray florets are fiery-red and the disc golden.

Eriogonum nudum rubrum. A.M. August 15, 1933. From Sir Wm. Lawrence, Bt. A small North American herbaceous plant belonging to a large and varied genus of Polygonaceae. The branched and almost leafless growths bear clustered inflorescences of small, rosy-red flowers.

Fritillaria obliqua. A.M. March 21, 1933. From the Knap Hill Nursery Co., Woking. A Grecian species with flowering stems a foot or more high bearing numerous lanceolate leaves and several pendulous, dull purple flowers.

Gentiana angustifolia, Leith Vale variety. A.M. April 25, 1933. From R. D. Trotter, Esq., Ockley, Surrey. A very attractive blue Gentian of the G. acaulis group, differing from the plant commonly grown under the latter name in its narrow, bright green foliage and elegant flowers borne on slender stalks two or three inches high.

Geum 'Gladys Perry.' A.M. May 23, 1933. From Mr. A. Perry, Enfield. A charming dwarf plant not exceeding 6 inches in height and having deep orange semi-double flowers 1½ inch in diameter.

*Gladiolus (Large-flowered) 'Magna Blanca.' A.M. July 20, 1933. Raised and sent by Mr. Carl Salbach, California. Plant $5\frac{1}{2}$ feet, very vigorous; flowers 5 inches diameter, creamy-white, 6 or 7 out at a time, 18 to 22 on a spike. Late-flowering.

Gladiolus 'The O'Mahony.' A.M. August 1, 1933. From R. D. Trotter, Esq., Leith Vale, Surrey. A well-formed deep scarlet variety of Californian origin lightly marked with cerise. The very fine spike exhibited had six open flowers.

Heliopsis scabra 'Incomparabilis.' A.M. August 15, 1933. From Messrs. Bloom, Oakington. A very free-flowering variety with semidouble, bright yellow flowers measuring 3 inches across and having the ray florets recurved. The disc is orange. The deep green, ovate, lanceolate leaves are coarsely serrated.

Iris Taitii. A.M. June 20, 1933. From C. Ingram, Esq., Benenden. A tall, slender, bulbous Iris closely related to the common Spanish Iris, *I. Xiphium*. The flowers are rather small, sky blue with a golden blotch on each of the falls.

*Irises. See pp. 172 and xxxiv.

Jasminum Parkeri. A.M. June 7, 1933. From Mr. G. P. Baker, Sevenoaks. A charming shrub small enough to be planted in the rock garden, where it can form a mass of slender branches a foot high. The tiny leaves have three or five ovate leaflets, and the yellow, six-lobed flowers appear in their axils. A native of the N.W. Himalaya.

Leucothoe Davisiae. A.M. June 7, 1933. From the R.H.S. Gardens, Wisley. An evergreen shrub of erect habit reaching a height

^{*} An asterisk means Award after trial at Wisley.

of three feet. The short-stalked, dark green leaves are oval and slightly toothed. The nodding white flowers are borne in upright, terminal and axillary panicles three inches long.

Leucothoe Keiskii. A.M. July 11, 1933. From Messrs. Hillier. An uncommon dwarf evergreen shrub from Japan. The leaves are ovate, two to three inches long, remotely serrate and glossy. The cylindric white flowers are over half an inch long and are produced in short, pendulous racemes from the upper leaf-axils.

Lilium \times 'Golden King.' A.M. July 11, 1933. From J. E. H. Stooke, Esq., Hereford. A very distinct hybrid said to have been raised from a cross between $L. \times crovidii$ (L. $croceum \times L.$ Davidi) and $L. \times cromottiae$ (L. $croceum \times L.$ Willmottiae). The specimen exhibited was three feet tall with narrow, light green, ciliate leaves and several large, somewhat reflexed bright yellow flowers spotted with crimson.

Lilium \times Maxwill. A.M. July 11, 1933. From F. C. Stern, Esq. A hybrid of L. Maximowiczii and L. Willmottiae. As might be expected of such parentage, the hybrid is a tall and handsome, abundantly leafy plant. The stout, elongated, terminal raceme is composed of shapely, orange-scarlet flowers on strong, spreading peduncles.

Lilium \times Philras 'Skinner's Orange.' A.M. June 7, 1933. From Lt.-Col. G. S. F. Napier, Horeham Road. A Canadian hybrid Lily. The habit is that of L. croceum; the flowers are bright orange-red with dark spots.

Lilium \times testaceum, Jones's var. A.M. July II, 1933. From F. Jones, Esq., Lechlade. A hybrid raised by crossing L candidum with L chalcedonicum var. maculatum. The inflorescence, unlike that of the usual form of L testaceum, is racemose like that of L candidum, and the more trumpet-shaped flowers recall that species. The perianth is of nankeen-yellow flushed with apricot and lightly spotted with scarlet.

*Lupin (Perennial) 'Blackpool Tower.' A.M. June 1, 1933. Raised and sent by The Garden Supplies, Liverpool. 4 feet; flower spikes 18 to 28 inches, blunt ended; flowers rich violet-blue, middle of standards creamy-white.

*Lupin (Perennial) 'Hades.' H.C. June 1, 1933. Raised and sent by Messrs. W. H. Simpson, Birmingham. 4 feet; flower spikes 20-24 inches, somewhat narrow; flowers rich bronzy-red, middle of the standards at base golden-yellow.

*Lupin (Perennial) 'Hercules.' A.M. June I, 1933. Raised and sent by Messrs. W. H. Simpson. 42 inches; flower spike 20 to 24 inches; flowers pale creamy-pink, centre of standards creamy-white.

*Lupin (Perennial) 'Lilac Domino.' A.M. June 1, 1933. Raised and sent by Messrs. W. H. Simpson. 4 feet; flower spikes 22–24 inches; flowers bright bluish-lilac, centre of standards creamy-white.

^{*} An asterisk means Award after trial at Wisley.

*Lupin (Perennial) 'Rowena.' A.M. June 1, 1933. Raised and sent by Messrs. W. H. Simpson. 4 feet; flower spikes 16 to 26 inches; flowers violet-purple, centre of standards reddish-purple.

Meconopsis betonicifolia pratensis. A.M. May 23, 1933. the Hon. H. D. McLaren, Bodnant. A tall and vigorous variety of the well-known and deservedly popular Blue Poppy, Meconopsis betonicifolia. This variety was collected by Kingdon Ward (No. 6862).

Montbretia 'Herbert Perry.' A.M. August 15, 1933. From the Hon. Mrs. E. S. Montagu, Attleborough, Norfolk. Flowers 3½ inches across, deep orange-scarlet, yellow throat. Parentage M. 'Lord Lambourne' \times M. Seedling 1/28.

Montbretia 'J. Alan Fitt.' A.M. August 15, 1933. From the Hon. Mrs. Montagu. Flowers 3 inches across, light orange-scarlet, yellow throat. Parentage M. 'His Majesty' × M. 'Lord Lambourne.'

Montbretia 'Rosemary.' A.M. August 15, 1933. From the Hon. Mrs. Montagu. Flowers 3 inches across, brilliant orange-scarlet blotched crimson, segments broad, golden-yellow throat. Parentage M. 'Queen Charlotte' × M. 'R. C. Notcutt.'

Narcissi. See p.-xliv.

Nierembergia frutescens. A.M. July 11, 1933. From F. C. Stern, Esq. The wiry stems of this beautiful plant branch copiously, forming an elegant, small bush furnished with short, linear leaves. The relatively large, campanulate flowers appear at the tips of the branchlets, and are pale blue, lighter at the edges and blotched with purple at the centre.

Nierembergia hippomanica. A.M. June 20, 1933. From T. Hay, Esq. A dainty little plant suitable for the cool greenhouse. The short, erect growths bear numerous linear leaves and solitary, campanulate, bluish-white flowers with darker veining.

Orchids. See p. xl.

Paeonia 'Charles England.' A.M. May 23, 1933. From Hiatt C. Baker, Esq., Almondsbury. A hybrid shrubby Paeony raised by crossing P. Delavayi and P. suffruticosa. It has large and handsome compound leaves and massive single flowers of satiny texture, purple suffused with maroon at the base of the petals.

Phlomis cashmeriana. A.M. July 11, 1933. From T. Hay, Esq. A herbaceous species from Northern India. The ample basal leaves are narrowly ovate, rugose and crenate. The white-tomentose stems are leafy and bear several whorls of flowers. The corolla is hooded and covered with down externally and has a broad, spreading, purple lip.

*Physostegia virginica 'Vivid.' A.M. Aug. 18, 1933. From Mr. A. Perry, Enfield. Plant 18 inches tall, very compact bushy habit; foliage dark green; flower spikes compact, branching; flowers 7/8 inch long, 1 inch wide, deep rich rose.

Picea Albertiana conica. A.M. May 23, 1933. From Messrs. Hillier, Winchester. A compact, dwarf conifer of pyramidal habit.

^{*} An asterisk means Award after trial at Wisley.

The light green foliage is very fine and dense. Of slow growth and easily propagated from cuttings.

Pimelia orthocephala. A.M. May 9, 1933. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A small, Australian shrub suitable for pot cultivation in the greenhouse. It is a gracefully branched plant with narrow leaves and round heads of small, pink-flushed white flowers.

*Polyanthus 'Bath White.' H.C. April 28, 1933. Raised and sent by Messrs. Blackmore & Langdon, Bath. Plant vigorous; flowers large, white, very freely borne. A good, even stock.

*Polyanthus 'Bath Yellow.' C. April 28, 1933. Raised and sent by Messrs, Blackmore & Langdon. Plant vigorous; flowers large, yellow shades, very freely borne.

Primula × Berninae, Windrush Variety. A.M. March 21, 1933. From P. Rosenheim, Esq., East Molesey. Primula × Berninae is a natural hybrid of P. hirsuta and P. viscosa found in Switzerland. The present variety, raised by Mr. Rosenheim, differs from the wild hybrid in failing to produce fertile seed. The flowers are rose-pink with a conspicuous white eye.

Primula Edgworthii. A.M. April 4, 1933. From T. Hay, Esq., Hyde Park, W. This Himalayan species of the Section Petiolares of the genus Primula is new to cultivation. The small lilac, yellow-eyed flowers are grouped on short peduncles rising from the spring rosettes of small, finely serrate, spathulate leaves. The leaves formed later in the season are much larger, triangular in shape and carried on long petioles.

Primula lichiangensis, Highdown var. A.M. May 23, 1933. From F. C. Stern, Esq. An improved form of a Western Chinese species. The flower-stems are stiffly erect, reaching a height of eighteen inches and bearing whorls of large, bright rosy-magenta blossoms. The lobed radical leaves are softly hairy.

Primula pubescens alba. A.M. April 4, 1933. From Messrs. C. Elliott, Stevenage. A Primula of the alpine Auricula group, known also as P. helvetica alba. The name P. pubescens has been used to cover a very large number of hybrids of P. auricula with P. hirsuta, P. viscosa and P. villosa. The present plant is a pretty, white-flowered member of this race.

Pyrethrums. See p. 180.

Pyrus kansuensis. A.M. May 9, 1933. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A handsome, though not showy, small tree with three-lobed, serrate leaves two to three inches long. The small flowers are white with a flush of pink and are arranged in clusters of about ten. The ellipsoid fruits are yellowish-red.

Pyrus magdeburgensis. A.M. April 25, 1933. From Mr. R. C. Notcutt, Woodbridge. A useful flowering tree of erect, fastigiate habit.

^{*} An asterisk means Award after trial at Wisley.

The cup-shaped flowers are semi-double, bright reddish-purple in the bud stage, but becoming paler when fully open.

Rhododendrons. See p. xxxv.

Rosa Ecae. A.M. May 9, 1933. From the Knap Hill Nursery Co. A small, Asiatic species of the Section Pimpinellifoliae, closely allied to R. Hugonis and R. xanthina, under the name of which it is figured in the Botanical Magazine (t. 7666). The leaves have seven to fifteen glandular, finely serrate leaflets. The small, buttercup-yellow flowers are followed by globose red fruits.

Rose 'Empress.' A.M. June 20, 1933. From Messrs. Chaplin, Waltham Cross. A very sweetly scented deep pink Hybrid Tea variety of good shape. The erect flowers are borne on stiff stems.

Rose 'Gartendirektor Nose.' A.M. June 20, 1933. From Messrs. Chaplin, Waltham Cross. A deep crimson Hybrid Tea variety of good shape. The flowers are very full and sweetly scented.

Rose 'Karen Poulsen.' A.M. August 1, 1933. From Messrs. Wood & Ingram, Huntingdon. A hybrid Polyantha Rose similar in type to 'Else Poulsen.' The bright crimson flowers are single and measure 3 inches across.

Rose 'Lord Lonsdale.' A.M. May 23, 1933. From Messrs. Dickson, Newtownards. A rich golden-yellow Hybrid Tea variety. The flowers are large and of good substance. They are particularly pleasing in bud.

Rosmarinus officinalis 'Benenden Blue.' A.M. May 9, 1933. From C. Ingram, Esq. This Rosemary was collected in Corsica by the exhibitor. The leaves are narrower than those of the type (the plant belonging to the variety angustissimus), and in the present variety the numerous flowers are of a most attractive bright blue colour.

Sandersonia aurantiaea. A.M. April 25, 1933. From L. de Rothschild, Esq., Exbury. A South African Liliaceous plant suitable for the cool house, but able to live outside in particularly favoured localities. From a tuberous root-stock arise slender stems reaching a height of three or four feet, clothed with pale green, lanceolate, pointed leaves. The bright golden flowers are almost globose and hang from the leaf-axils on curving, wiry stalks.

Saxifraga diapensioides. A.M. April 4, 1933. From Messrs. C. Elliott. A very lovely species of the Kabschia section, forming dense cushions of erect growths tipped with rosettes of very small and hard silver-grey leaves. The flowers are large and white, singly borne or in pairs on two-inch stalks.

Scabiosa speciosa. A.M. July 4, 1933. From T. Hay, Esq. A Himalayan species. The leaves are opposite, lanceolate with rounded bases, and downy. The lavender flowers are variable in depth of colour, and have much the appearance of some varieties of S. caucasica.

Serapias neglecta. A.M. March 21, 1933. From the Hon. H. D. McLaren. A terrestrial Orchid suitable for the cool house. The leaves are lanceolate and the flowers, which rise from the axils of large, red-striped bracts, are hooded and have spreading crimson lips.

Silene Ingramii. A.M. May 23, 1933. From Miss Enid M. Vale, Wolverhampton. A small plant about four inches in height for the rock garden. The leaves are opposite, ovate-lanceolate, pale green and finely hairy. Flowers pale pink.

Sophora viciifolia. A.M. June 7, 1933. From F. C. Stern, Esq. A somewhat spiny shrub from W. China reaching a height of six feet. The small leaves have a large number of elliptic leaflets covered beneath with a silky pubescence. The small, bluish-white flowers have violet calyces and are carried in short racemes at the ends of lateral branchlets.

Statice 'Coeleste.' A.M. August 15, 1933. From Messrs. L. R. Russell. A fine variety of the S. profusa type suitable for greenhouse cultivation. The flowers are bright lavender-blue and are carried in much-branched clusters on strong winged stems.

*Sweet Peas. See p. 187.

Syringa 'Kathleen Havemeyer.' A.M. May 9, 1933. From Mr. R. C. Notcutt. This is a very handsome Lilac with remarkably large flowers in shapely trusses. The unopened buds are deep purplish-red, but on opening they gradually lose colour and the flower finally becomes clear mauve.

Thalictrum kusianum. A.M. May 23, 1933. From Sir William Lawrence, Bt., V.M.H., Burford. An elegant Japanese plant about six inches in height suitable for the rock garden. The divided leaves are greyish-green, the flowers light rosy-purple, in branched sprays.

Tulips. See p. xlv.

Viola eizanensis. A.M. March 7, 1933. From L. de Rothschild, Esq. A small and dainty species from the Hokkaido mountains of Japan. The leaves are finely divided as in *V. pedata* and form a somewhat dense tuft, above which rise numerous sweetly scented, white flowers of rounded form and marked with a few mauve lines. The species was recommended for the cool house, but M. Correvon states that it has proved hardy at Geneva.

DAHLIAS AT WISLEY, 1933.

THE trial of new Dahlias selected at Vincent Square as of possible value for garden decoration was continued on the same lines as in former years. One hundred and six new varieties were included and planted side by side with varieties that had gained awards in their respective groups in former trials, making a total of 330 varieties in all. The growth and flowering of almost all varieties were excellent, and most of the plants were at their best when the Joint Dahlia Committee judged them on August 31, 1933.

Some new forms have arisen since the classification of Dahlias for garden purposes was last drawn up, and the Joint Committee has had their classification under consideration and has prepared a new classification to provide for these new-comers. We give the new classification below, with names of representative varieties where no new varieties received awards. Illustrations of examples of many of these classes were given in our JOURNAL R.H.S., 49. New classes are illustrated here.

I. SINGLE DAHLIAS.

Single Dahlias have a single regular outer ring of ray florets, the centre forming a disc.

Class I a.—Show Singles should not exceed 3 inches in diameter, and the 8 (only) ray florets should be smooth, somewhat recurved at the tips, broad and overlapping so as to form a perfectly round flower.

Examples:—Mamie (A.M. 1923), The Countess, Princess Margaret, Little Jenny.

Class I b.—Singles in which the ray florets do not so completely overlap and the tips are separated.

Examples: Bishop Crossley (A.M. 1922), Clematis (A.M. 1922), Aimée Barillet (A.M. 1925).

Class I c .- Mignon Dahlias. Plants do not exceed 18 inches in height.

Pink.

Murillo (Raised and sent by Messrs. Cheal of Crawley), H.C. Aug. 31, 1933.—28 inches. Flowers $2\frac{1}{2}$ to $2\frac{3}{4}$ inches diameter; pale rose-pink, broadly zoned at disc crimson-maroon; on 6- to 9-inch stalks, erect and well above foliage.

Orange.

Fay (Raised and sent by Messrs. Burrell of Cambridge), A.M. Aug. 31, 1933.—2 feet. Flowers $2\frac{3}{4}$ to $3\frac{1}{4}$ inches diameter; orange shaded scarlet; on 6- to 10-inch stalks, erect and well above foliage.

Scarlet.

Biddy Drury (Raised and sent by Messrs. Burrell), A.M. Aug. 31, 1933.—2 feet. Flowers 3 to 3½ inches diameter; bright rich crimson-

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scarlet, paler towards the disc; erect, on 6- to 10-inch stalks, well above foliage, very freely borne.

II. ANEMONE-FLOWERED DAHLIAS.

Class II .- Anemone-flowered Dahlias have one or more rings of flat rays surrounding a dense group of tubular florets, longer than the disc florets of Class I, and usually of a different colour.

Example: Mons. C. H. Dupont.

Scarlet.

HENRY BURGESS (Pritchard).—2 feet. Flowers 21 to 3 inches diameter; scarlet; erect, on 4- to 8-inch stalks, well above foliage.

III. COLLERETTE DAHLIAS.

Collerette Dahlias have one or more rings of flat rays as in Singles and above each a ring of florets (the collar), generally of a different colour and only half their length.

Class III a .- Collerette Single Dahlias have only a single row of rays and one "collar," with a central disc.

Maroon.

Carmel (Raised and sent by Messrs. Cheal), H.C. Aug. 31, 1933.— 4 feet. Flowers 3 to 3½ inches diameter; deep maroon, collar white flushed purple towards the disc; free and erect, on 6- to 12-inch stalks, well above foliage.

Tyre (Cheal).— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{4}$ inches diameter, deep maroon collar white flushed pale purple towards the disc, free and erect, on 9- to 15-inch stalks, well above foliage.

Class III b.—Collerette Pæony-flowered Dahlias have two or three rows of rays and "collars," with a central disc.

Class III c .- Collerette Decorative Dahlias are similar, but are fully double. Example: Aureen (fig. 76).

IV. PÆONY-FLOWERED DAHLIAS.

Class IV a.—Large Pæony-flowered Dahlias with flowers over 7 inches in diameter.

Example: Psyche (A.M. 1922).

Rose-Pink.

LILIAN HEWITT (Stredwick).—6 feet. Flowers 7 to 8 inches diameter, bright, pale rose-pink; free, erect, on 9- to 18-inch stalks, well above foliage.

Class IV b .-- Medium Pæony-flowered Dahlias with flowers between 5 and 7 inches in diameter.

Example: Lady Heath (A.M. 1925).

Scarlet.

Wantage (Cobb).—4 feet. Flowers 5 to 6 inches diameter, bright deep rich crimson-scarlet; free, erect, on 6- to 12-inch stalks, well above foliage.

Crimson.

Rubens (Dodd).—4 feet. Foliage deeply tinged purple; flowers 5 to 6 inches diameter, deep rich crimson, tips purplish; free, inclined to droop, on 6-to 12-inch stalks, well above foliage.

Class IV c.-Small Pæony-flowered Dahlias with flowers less than 5 inches in diameter.

Apricot. '

Dawn Princess (Raised and sent by Mr. A. J. Cobb of The University, Reading), H.C. Aug. 31, 1933.—5 feet. Flowers 3 to 4 inches diameter, bright orange-apricot; free, erect, on 9- to 12-inch stalks, well above foliage.

Tova (Burrell).—4 feet. Flowers $3\frac{1}{2}$ to 4 inches diameter, bright rich goldenapricot; free, erect, on 6- to 9-inch stalks, well above foliage.

Rose Shades.

PLACID (Burrell).—4½ feet. Flowers 3½ to 4½ inches diameter, soft light rose, base of florets lemon, fades somewhat; florets often twisted over disc; free, erect, on 6- to 12-inch stalks, well above foliage.

Memory (Raised and sent by Mr. J. T. West of Brentwood), H.C. Aug. 31, 1933.—4 feet. Flowers 3½ to 4 inches diameter, bright light rose, base of petals creamy-yellow; free, erect, on 9- to 16-inch stalks, well above foliage.

CORALLINA (Burrell).—4 feet. Flowers 3½ to 4½ inches diameter, creamy-salmon-rose, tips much paler; free, erect, on 6- to 12-inch stalks, well above foliage.

CONWYN (Cobb).—5 feet. Foliage purplish. Flowers 3 to 3½ inches diameter, dull deep rosy-carmine, tips much paler; petals widely channelled; disc goldenbrown; not very free and drooping on 9- to 14-inch stalks.

Old Rose.

Sadie (Burrell).—5 feet. Flowers 4 to $4\frac{1}{2}$ inches diameter, dull old rose; florets flat, twisted over disc; free, erect, on 9- to 15-inch stalks, well above foliage.

Yellow shaded Red.

Damascus (Cheal).—4 feet. Flowers 3 to 4 inches diameter, lemon-yellow lightly flushed scarlet; florets flat; free, erect, on 9- to 12-inch stalks, well above foliage.

Token (Raised and sent by Mr. J. T. West), H.C. Aug. 31, 1933.—3½ feet. Flowers 3½ to 4 inches diameter, bright orange suffused rosy-red; florets channelled; very free, erect, on 9- to 12-inch stalks, well above foliage.

Rosy-Red.

BEE (Burrell).— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{2}$ inches diameter, deep rich rosyred; florets channelled; very free, inclined to droop, on 6- to 12-inch stalks, well above foliage.

Orange-Scarlet.

ADDIE (Treseder).— $5\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches, bright orange-scarlet, tips rosy-red, florets flat, inner incurved and twisted; free, erect, on 9- to 12-inch stalks, well above foliage.

Scarlet Shades.

AILEEN O'BRIEN (Cobb).— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{2}$ inches diameter, rich rosy-scarlet; florets flat; free, somewhat drooping, on 6- to 15-inch stalks, well above foliage.

St. Patricks (Raised and sent by Mr. A. J. Cobb), A.M. Aug. 31, 1933.— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter, bright scarlet; florets flat; very free, erect, on 6- to 12-inch stalks, well above foliage.

ATHLETE (West).— $5\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches diameter, scarlet; florets channelled, reflexed at tips; free, erect, on 9- to 15-inch stalks, well above foliage.

Crimson Shades.

ALETH MOREAU (Cobb).— $3\frac{1}{2}$ feet. Foliage purplish. Flowers 3 to $3\frac{1}{2}$ inches diameter, crimson; florets flat; disc brownish; free, erect, on 6- to 12-inch stalks, well above foliage.

Miriam (Burrell).—3½ feet. Flowers 3 to 3½ inches diameter, bright purplishcrimson, broadly tipped pale rose-pink; florets flat; free, erect, on 6- to 12-inch stalks, well above foliage.

Class IV d.—Dwarf Pæony-flowered Dahlias do not exceed 2 feet 6 inches in height.

Example: Hermia (A.M. 1926).

Rose.

JOYCE ADKINS (Gibson & Amos).—22 inches. Flowers 3 inches diameter, pale rose-pink shading to rosy orange-red at disc; free, erect, on 4- to 9-inch stalks, well above foliage.

Salmon on Cream.

Pigmy (Raised and sent by Messrs. Burrell), H.C. Aug. 31, 1933.—
16 inches. Habit very compact. Flowers 3 to 3½ inches diameter, bright rosy-salmon on cream, suffused scarlet at disc; florets flat, very free, erect, on 6- to 8-inch stalks, well above foliage.

Scarlet.

Eros (Cobb).—20 inches. Flowers 2½ to 2¾ inches diameter, bright scarlet; florets flat; free, erect, on 6- to 9-inch stalks, well above foliage.

V. FORMAL DECORATIVE DAHLIAS.

Formal Decorative Dahlias have fully double flowers, showing no disc. All the floral rays are regularly arranged, the margins of the florets being usually slightly incurved and more or less flattened towards the tips, which may be broadly pointed or rounded.

The plants in this section fall into four groups corresponding with the four

groups of Section IV.

Class V a .- Large Formal Decorative Dahlias.

Example: Robert Treat.

Class V b .- Medium Formal Decorative Dahlias.

Pale Rose-Pink on Yellow.

Lady Lawrence (Raised and sent by Messrs. Cheal), A.M. Aug. 31, 1933.—6 feet. Flowers 5 to 6 inches diameter, bright clear pale rosepink on yellow; florets flat, inner channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

Crimson on Yellow.

Dubarry (Potter).— $5\frac{1}{2}$ feet. Flowers 5 inches diameter, dull rosy-crimson on yellow; florets channelled; free, erect, on 6- to 12-inch stalks, well above foliage.

Class V c .- Small Formal Decorative Dahlias.

Orange-Apricot.

GLADSOME (Burrell).—4 feet. Flowers 3 to $3\frac{1}{2}$ inches diameter, bright rich orange-apricot; florets flat, inner channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

Beata (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{4}$ inches diameter, dull orange-apricot shaded rosy-carmine; florets channelled; free, erect, on 9- to 14-inch stalks, well above foliage.

Pink on Yellow.

Ernest Hewitt (Raised and sent by Messrs. Burrell), A.M. Aug. 31, 1933.—5 feet. Flowers 3 to 3½ inches diameter, bright pale rose, tips paler, shading to deep lemon at disc; florets channelled; very free and erect on 9- to 12-inch stalks, well above foliage.

Merle (Raised and sent by Messrs. Burrell), H.C. Aug. 31, 1933.— $5\frac{1}{2}$ feet. Flowers 4 to $4\frac{1}{2}$ inches diameter, bright pale rose shading to lemon-yellow at base of the broadly channelled florets; free, erect, on 9- to 12-inch stalks, well above foliage.

Evan (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches diameter, bright rosy-mauve, base of widely channelled florets yellowish; very free, erect, on 9- to 12-inch stalks, well above foliage.

Rose.

ORNATE (Burrell).—4 feet. Flowers 3½ to 4½ inches diameter, bright rich rose; florets channelled; free, erect, on 6- to 10-inch stalks, well above foliage.

Rosy-Carmine.

Celtic (Raised and sent by Messrs. Burrell), A.M. Aug. 31, 1933.—5 feet. Flowers 4 inches diameter, rosy-carmine shaded crimson towards and at base of the widely channelled florets; free, erect, on 9- to 15-inch stalks, well above foliage.

Rosy-Red.

Marjorie Hewitt (Burrell).— $4\frac{1}{2}$ feet. Flowers 3 to $3\frac{1}{2}$ inches diameter, bright rosy-red, tips paler; florets reflexed, channelled; free, on erect 6- to 14-inch stalks, well above foliage.

Basil (Cheal).—6 feet. Flowers 3½ to 4 inches diameter, deep rich rosy-red; florets reflexed and channelled; free, erect, on 9- to 18-inch stalks, well above foliage.

Orange-Scarlet.

Mary Drury (Raised and sent by Messrs. Burrell), H.C. Aug. 31, 1933.—6 feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{4}$ inches diameter, bright orange-scarlet; florets channelled, reflexed; free, erect, on 9- to 16-inch stalks, well above foliage.

Phœnix (West), H.C. Aug. 21, 1933.—5 feet. Flowers 3½ to 4 inches diameter, orange lightly shaded scarlet, reverse of channelled reflexed florets rosy-scarlet on orange; very free, erect, on 9- to 15-inch stalks, well above foliage.

Scarlet.

Crusoe (Raised and sent by Messrs. Cheal), A.M. Aug. 31, 1933.—4 feet. Flowers 3½ to 4 inches diameter, bright scarlet, tips somewhat paler; florets blunt, reflexed and channelled; very free, erect, on 9- to 14-inch stalks, well above foliage. (Gold Medal N.D.S. 1933.)

Martha (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches diameter, bright scarlet; florets blunt, flat; free, erect, on 6- to 12-inch stalks, well above foliage.

Dover (Raised and sent by Messrs. Cheal), A.M. Aug. 31, 1933.— 4 feet. Flowers 3 to 31 inches diameter, deep rich scarlet; florets blunt, reflexed, channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

Edith Cartwright (Raised and sent by Messrs. Burrell), A.M. Aug. 31, 1933.—5½ feet. Flowers 3½ to 4½ inches diameter, bright crimson-scarlet; florets blunt, flat, inner channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

Class V d .- Dwarf Formal Decorative Dahlias ..

Example: Catherine Clark (A.M. 1932).

VI. INFORMAL DECORATIVE DAHLIAS.

Informal Decorative Dahlias have fully double flowers, showing no disc. The floral rays are not regularly arranged, broad, scarcely revolute, more or less flat or slightly twisted, and more or less pointed.

The plants in this section fall in four groups corresponding with the four

groups in Section IV.

Class VI a .- Large Informal Decorative Dahlias.

Yellow.

COLONEL A. V. USHER (Stredwick).— $3\frac{1}{2}$ feet. Flowers 7 to 8 inches diameter, bright sulphur; florets flat, somewhat twisted; free, erect, on 9- to 12-inch stalks, well above foliage.

Mrs. George Chibnall (Stredwick).—6 feet. Flowers 7 to 8 inches diameter, bright lemon-yellow; florets flat, reflexed at tips; free, erect, on 9- to 16-inch

stalks, well above foliage.

F. L. Gibson (Raised and sent by Mr. Stredwick of St. Leonardson-Sea), H.C. Aug. 31, 1933.—Described Journal R.H.S. 58, p. 194.

Yellow shaded Red.

Effective (Stredwick).—61/2 feet. Flowers 7 to 9 inches diameter, goldenyellow lightly shaded scarlet; florets flat, margins revolute at tips; free, erect, on 9- to 15-inch stalks, well above foliage.

South Africa (Raised and sent by Messrs. de Mole & Kirsch of Maritzburg, S. Africa), A.M. Aug. 31, 1933.—6 feet. Flowers 7 to 9 inches diameter, golden-yellow lightly suffused scarlet, inner florets darker; florets flat; free, erect, on 12- to 18-inch stalks, well above foliage.

Golden-Apricot.

FAIRYLAND (Stredwick).--4 feet. Flowers 7 to 8 inches diameter, bright rich golden-apricot; florets flat, inner somewhat channelled; free, erect, on 6- to 12-inch stalks, well above foliage.

Mastodon (Stredwick).—5½ feet. Flowers 9 to 11 inches diameter, bright rich golden-apricot; florets curled, flat; free, erect, on 9- to 12-inch stalks,

above foliage.

Mauve.

Pink Prestige (Raised and sent by Messrs. Stredwick), H.C. Aug. 31, 1933.—Described Journal R.H.S. 58, p. 194.

OLIVIA (de Mole & Kirsch).-62 feet. Flowers 8 to 10 inches diameter, pale rosy-mauve; florets flat, margins revolute at tips; free, erect, on 9- to 12-inch stalks, above foliage.



Fig. 76.—Dahlia 'Aureen.'
Class IIIc. Collerette Decorative.



Fig. 77.—Dahlia 'Rose Velthuys.'
Class IVa. Large Pæony-flowered.
(much reduced)



Fig. 78.—Dahlia 'Lysette.' Class IVc. Small Pæony-flowered.



Fig. 79.—Dahlia 'Evelyn Hancock.' Class Xa. Semi-Cactus.

Orange-Scarlet.

D. B. Crane (Raised and sent by Messrs. Stredwick), H.C. Aug. 31, 1933.—5½ feet. Flowers 8 to 10 inches diameter, bright glowing orange-scarlet; florets flat, pointed, margins revolute at tips; free, erect, on 6- to 12-inch stalks, above foliage.

Purplish Crimson.

COMMODORE (Stredwick).— $5\frac{1}{2}$ feet. Flowers 7 to 8 inches diameter, deep rich purplish-crimson, tips of flat florets pale purple; free, erect, on 6- to 12-inch stalks, above foliage.

Purple.

Blue Boy (Stredwick).—6 feet. Flowers 7 to 8 inches diameter, pale rosypurple; florets flat, inner channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

Class VI b .- Medium Informal Decorative Dahlias.

White.

Dunmow Bride (Pannell).—4½ feet. Flowers 5 inches diameter; florets channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

White shaded Rosy-Carmine.

JOHN A. CAMPBELL (West).—5 feet. Flowers 6 inches diameter; white lightly suffused and edged rosy-carmine; florets flat, inner incurved; free, erect, on 9- to 15-inch stalks, well above foliage.

Cream-Pink.

Northern Beauty (Raised and sent by Messrs. Dickson & Robinson of Cathedral St., Manchester), H.C. Aug. 31, 1933.—Described JOURNAL R.H.S. 58, p. 195.

Pink on Yellow.

BRIDESMAID (West).—6½ feet. Flowers 6 to 7 inches diameter, soft pale rose-pink, base of florets yellow; florets flat, inner channelled; free, erect, on 9-to 18-inch stalks, well above foliage.

ATTRACTION (West).—4½ feet. Flowers 5 to 5½ inches diameter, bright pale rose-pink on orange, tips paler; florets flat, inner channelled; free, erect, on 9- to 12-inch stalks, well above foliage.

Libra (Raised and sent by Messrs. Burrell), A.M. Aug. 31, 1933.—6 feet. Flowers $5\frac{1}{2}$ to $6\frac{1}{2}$ inches diameter, bright rich pinkish apricot on orange; florets flat, margins of inner recurved; free, erect, on 9- to 16-inch stalks, well above foliage.

Rose.

MAYPOLE (West).—6 feet. Flowers 5 to 6 inches diameter, bright pale rose; florets flat, inner channelled; free, erect, on 9- to 15-inch stalks, well above foliage.

Maune

ADEN (Cheal).—5½ feet. Flowers 5 to 6 inches diameter, pale rosy-mauve; florets flat, margins somewhat revolute; free, erect, on 9- to 14-inch stalks, well above foliage.

Rosy-Cerise, tips paler.

ANNE HAY (West).—5½ feet. Flowers 5 to 6 inches diameter, bright rosycerise, tips pale, base of petals shaded orange; florets with margins recurved at tips, inner flat; free, erect, on 9- to 15-inch stalks, well above foliage.

Scarlet.

RED KING (Buckwell).-61 feet. Flowers 5 to 6 inches diameter, bright scarlet; florets reflexed, channelled; free, erect, on 6- to 12-inch stalks, well above foliage.

Crimson.

BEN LAWERS (Dobbie) .- 6 feet. Flowers 5½ to 6 inches diameter, deep rich rosy-crimson, tips magenta; florets flat, inner channelled; free, erect, on 9- to 16-inch stalks, well above foliage.

OTTAWA (Cheal).—6 feet. Flowers 5½ to 6½ inches diameter, rich deep crimson; florets flat, twisted towards apex; free, erect, on 6- to 12-inch stalks,

well above foliage.

Class VI c .- Small Informal Decorative Dahlias.

Pink on Yellow.

Cavalcade (Raised and sent by Mr. J. T. West), H.C. Aug. 31, 1933.—4½ feet. Flowers 4 to 5 inches diameter, pale rose-pink shading to lemon at disc; florets flat, inner channelled; free, erect, on 9- to 14-inch stalks, well above foliage.

TITLARK (Stredwick).—3½ feet. Flowers 3 to 3½ inches diameter, bright pale rose-pink on orange, at disc orange; florets flat, inner channelled; free, erect, on 6- to 9-inch stalks, above foliage.

Rubicon (West).—5 feet. Flowers 4 to $4\frac{1}{2}$ inches diameter, bright deep rose; florets flat; free, erect, on 6- to 12-inch stalks, well above foliage.

Carmine Shades.

Derwentwater (West).—5 feet. Flowers $3\frac{1}{2}$ to 4 inches diameter, at tips bright carmine-rose shading to lemon at disc; florets incurved, curled; very

GLEE (Burrell).—3 feet. Flowers 3 to 3½ inches diameter, pale rosy-carmine shading to orange at disc; florets channelled; free, erect, on 6- to 9-inch stalks,

well above foliage.

MARGARETTA V. DRURY (Burrell).—5 feet. Flowers 3½ to 4 inches diameter, deep carmine shading to orange-scarlet at disc; florets flat, inner channelled; free, erect, on 9- to 14-inch stalks, well above foliage.

Scarlet and White.

ELVIC (Burrell).-4 feet. Flowers 3½ to 4½ inches diameter, scarlet, inner florets white edged crimson-scarlet; florets flat; free, erect, on 6- to 12-inch stalks, well above foliage.

Scarlet.

NAOMI (Burrell).-4½ feet. Flowers 3½ to 4 inches diameter, bright rich scarlet; florets channelled; free, erect, on 9- to 12-inch stalks, at first hidden by foliage, afterwards above.

Class VI d .- Dwarf Informal Decorative Dahlias.

Orange-Scarlet.

Brentwood Scarlet (Raised and sent by Mr. West), H.C. Aug. 31, 1933.—21 feet. Flowers 4 to 6 inches diameter, bright orangescarlet; florets flat, tips curled; free, erect, on 6- to 9-inch stalks, well above foliage.

Scarlet.

Autumn Bedder (Raised and sent by Mr. West), A.M. Aug. 31, 1933.—28 inches. Habit very compact, erect. Flowers 4 to 6 inches diameter, bright rich scarlet; florets flat, inner channelled; very free, erect, on 4- to 9-inch stalks, well above foliage.

OWLET (West).— $2\frac{1}{2}$ feet. Flowers $4\frac{1}{2}$ to 6 inches diameter, rich crimsonscarlet; florets flat, inner channelled; free, erect, on 6- to 9-inch stalks, well above foliage.

VII. SHOW DAHLIAS.

Show Dahlias have fully double flowers, over 3 inches in diameter, almost globular, with central flowers like the outer, but smaller; florets with margins incurved, tubular, short and blunt at the mouth.

This class includes the Dahlias of this form with florets tipped white or striped, sometimes called "Fancy" Dahlias.

Examples: Doreen (A.M. 1922), Merlin (A.M. 1921).

VIII. POMPON DAHLIAS.

Pompon Dahlias have flowers like those in Section VII, but smaller. For show purposes Pompon Dahlias must not exceed 2 inches in diameter.

White.

Ian (Raised and sent by Messrs. Burrell), H.C. Aug. 31, 1933.— 4 feet. Flowers 2 inches diameter, white; free, erect, on 6- to 10-inch stalks, well above foliage.

Yellow.

Yellow Gem (Sent by Messrs. Gibson & Amos of Cranleigh), H.C. Aug. 31, 1933.—4½ feet. Flowers 2 to 2½ inches diameter, sulphur; free, erect, on 6- to 9-inch stalks, well above foliage.

Orange and Terra-cotta.

Master Michael (Raised and sent by Mr. E. Austin of Winkfield Place Gardens, Berks), A.M. Aug. 31, 1933.—Described Journal R.H.S. 58, p. 197.

Scarlet.

Gertrude (Raised by Mr. Carl Salbach and sent by Messrs. Gibson & Amos), H.C. Aug. 31, 1933.— $4\frac{1}{2}$ feet. Flowers 2 to $2\frac{1}{2}$ inches diameter, rich scarlet; free, erect, on 6- to 9-inch stalks, well above foliage.

Purple.

SID (Burrell).— $4\frac{1}{2}$ feet. Flowers $2\frac{1}{4}$ inches diameter, pale purple; free, erect, on 6- to 10-inch stalks, above foliage.

IX. CACTUS DAHLIAS.

Cactus Dahlias have flowers fully double with the margins of the florets revolute for not less than three-quarters of their length, the central florets forming a filbert-shaped group.

Class IX a.—Large-flowered Cactus Dahlias have flowers over 4½ inches in diameter.

Yellow.

Victoria (Stredwick), A.M. Aug. 31, 1933.—Described Journal R.H.S. 58, p. 197.

Apricot Shades.

FRIGATE (Stredwick)—6½ feet. Flowers 7 inches diameter, rich pinkish

apricot shaded salmon; free, erect, on 6- to 14-inch stalks, above foliage.

LANDMARK (Stredwick).—7 feet. Flowers 7 to 8 inches diameter, pale pinkish apricot, base of florets pale lemon; free, but drooping, on 6- to 10-inch stalks, above foliage.

Orange-Scarlet.

R. DE B. KENNARD (Stredwick) .- 6 feet. Flowers 8 inches diameter, bright orange-scarlet; free, erect, on 9- to 12-inch stalks, well above foliage.

Crimson-Scarlet.

R. Twyford (Stredwick).—4½ feet. Flowers 8 to 9 inches diameter, rich crimson-scarlet; free, erect, on 6- to 10-inch stalks, well above foliage.

Class IX b.—Small-flowered Cactus Dahlias have flowers not exceeding 41 inches in diameter.

Pink on Yellow.

Betty Coombs (Raised and sent by Messrs. Treseder), H.C. Aug. 31, 1933.-4½ feet. Flowers 3½ to 4 inches diameter, bright rich rosepink shading to lemon at disc; very free, erect, on 6- to 10-inch stalks, well above foliage.

Class IX c.—Dwarf Cactus Dahlias do not exceed 2½ feet in height.

Examples: Amanda, Reg.

X. SEMI-CACTUS DAHLIAS.

Semi-Cactus Dahlias have fully double flowers with florets broad at the base and margins revolute towards the apex, slightly twisted for about half their

Plants in this section fall into three groups corresponding with the three groups of Section IX.

Class X a .- Large-flowered Semi-Cactus Dahlias.

White faintly tinged Pink.

Silver Column (Raised and sent by Mr. J. T. West), A.M. Aug. 31, 1933.—6 feet. Flowers 6 to 7 inches diameter, creamy-white, inner florets very faintly tinged pale mauve; free, erect, on 9- to 16-inch stalks, well above foliage.

SEAGULL (West).—51 feet. Flowers 6 to 71 inches diameter, white very faintly lined and flushed pale blush-pink; free, erect, on 9- to 18-inch stalks, well above foliage.

Yellow.

St. Fagans (Raised and sent by Messrs. Treseder), A.M. Aug. 31, 1933.—6 feet. Flowers 6 to 7 inches diameter, bright lemon-yellow, very free, erect, on 9- to 15-inch stalks, well above foliage.

Pink on Yellow.

Pearl Queen (Raised and sent by Mr. J. T. West), H.C. Aug. 31, 1933.—6 feet. Flowers 6 inches diameter, very pale salmon-rose on cream, base of florets sulphur; free, erect, on 8- to 15-inch stalks, well above foliage.

Pauline James (Stredwick).—6½ feet. Flowers 6 to 7 inches diameter, soft creamy salmon; somewhat free, erect, on 4- to 9-inch stalks, just above foliage.

Absolute (Raised and sent by Mr. J. T. West), A.M. Aug. 31, 1933.—6 feet. Flowers 7 to 8 inches diameter, bright glowing rosycarmine, base of florets bright lemon; free, erect, on 9- to 15-inch stalks, well above foliage.

Scarlet.

COLONEL (Cheal).—4 feet. Flowers 5 to 6 inches diameter, bright rich scarlet; very free, erect, on 9- to 12-inch stalks, well above foliage.

Crimson.

Queen Lois (Barwise).—5½ feet. Flowers 5 to 6 inches diameter, bright scarlet-crimson; free, erect, on 9- to 12-inch stalks, well above foliage.

Class X b.—Small-flowered Semi-Cactus Dahlias.

Rose-Pink

ROSEMARY (Burrell).—5 feet. Flowers 4 to $4\frac{1}{2}$ inches diameter, bright rich rose-pink; free, somewhat drooping on 9- to 12-inch stalks, well above foliage.

Crimson.

Winnie Benge (Stredwick).—4 feet. Flowers 4 inches diameter, bright crimson, tips paler; very free, erect, on 6- to 9-inch stalks, well above foliage.

Ruby.

Ruby Tips (West).—4 feet. Flowers $4\frac{1}{2}$ inches diameter, deep ruby, tips paler; free, erect, on 9- to 16-inch stalks, well above foliage.

Class X c .- Dwarf Semi-Cactus Dahlias.

XI.—STAR DAHLIAS.

Small, with two or three rows of somewhat pointed rays, not or scarcely overlapping at their more or less recurved margins, and forming a cup-shaped flower with a disc.

Class XI.—Star Dahlias.

Example: Crimson Star (A.M. 1925).

Golden Apricot.

GOLDSTAR (West).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches diameter; free, erect, on 9- to 15-inch stalks, well above foliage.

Pink on Yellow.

STARSTONE (West).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter, pale rosepink shading to lemon at disc; free, erect, on 6- to 12-inch stalks, well above foliage.

HOLMWOOD STAR (Cheal).—4 feet. Flowers 3 to 3½ inches diameter, pale salmon-rose shaded orange towards disc; free, erect, on 6- to 12-inch stalks,

well above foliage.

Scarlet.

Buckland Star (Cheal).—5 feet. Flowers 3 to $3\frac{1}{2}$ inches diameter; bright scarlet, tips sulphur, shaded lemon towards disc; free, erect, on 9- to 14-inch stalks, well above foliage.

DELPHINIUMS AT WISLEY, 1933.

A JOINT committee consisting of members appointed by the Royal Horticultural Society and by the National Delphinium Society has recently been set up to judge and recommend awards for Delphiniums that are brought forward either at the Royal Horticultural Society's meetings at Vincent Square, or the special meetings of the National Delphinium Society, or are grown in the trials at Wisley.

Delphiniums form one of the Standard Collections at Wisley against which new-comers are judged for value as garden plants, and the present report shows the varieties now growing in the Standard Collection, both old and new, which the Joint Committee at its meeting on June 26, 1933, under the Chairmanship of Mr. G. W. LEAK, V.M.H., selected for award, and also gives descriptions in smaller type of varieties under trial which have not yet been described in our JOURNAL.

The total number of varieties in the trial was 240, but descriptions of many that have had awards in the past, and are now not regarded as quite up to the standard of those to which Awards are now given, have already been printed and are not now included.

The grouping is first into the "Belladonna type" with open inflorescences and usually dwarfer habit, and the "Elatum type" with erect spikes of flower, often very tall. Under these the crossheadings indicate the form of the flower-single, semi-double, doubleand again the general colour, also indicated by cross-headings.

The name of the raiser is given when known and the address of the sender to the trial when the name is first mentioned in connexion with a plant to which an Award has been given.

AWARDS, DESCRIPTIONS, AND NOTES.

Belladonna Type.

Flowers white.

Moerheimii (Raised and sent by Messrs. Ruys of Holland and also sent by Messrs. van Egmond of Holland), H.C. June 26, 1933.—41 feet; spike somewhat tapering, 11 foot long; side spikes many; flowers 13 inch; eye creamy-white. Resistant to mildew.

Flowers pale blue.

Belladonna semiplenum (Ruys, van Egmond), A.M. June 26, 1933.— 3½ feet; spike 12 inches long; side spikes many; flowers semidouble, 11 inch, pale sky-blue, inner petals flushed pale lilac: eve brownish

Flowers dark blue.

Orion (Raised by Mr. F. Koppius and sent by Messrs. Bakers of Codsall, Wolverhampton), H.C. June 26, 1933.—5½ feet; spike 16 inches long; side spikes many; flowers 1½ inch, single, bright forgetme-not blue; eye white.

Horatius (Raised by Mr. F. Koppius and sent by Messrs. van Egmond and Messrs. Ruys), H.C. June 26, 1933.—5 feet; spike 18 to 24 inches long; side spikes many; flowers 2 inches, semi-double, deep forget-me-not blue; eye brownish.

Theodora (Raised by Mr. Hendriksen, sent by Messrs. van Egmond and Messrs. Ruys), A.M. June 26, 1933.—5½ feet; spike 2 feet long; side spikes many, strong; flowers single, 1¾ inch diameter, bright pale gentian-blue; eye brown.

Barwick Gem (Gurden).— $3\frac{1}{2}$ feet. Spikes 9 to 18 inches long; side spikes many, weak; flowers single, $1\frac{1}{2}$ inch, deep rich ultramarine-blue; eye purplishmauye.

Isis (Raised by Messrs. Gibson of Learning Bar, sent by Mr. Bones of Cheshunt), A.M. June 26, 1933.—3½ feet; spike 12 to 18 inches long; very freely borne; side spikes very many, strong; flowers 2¾ inches, single, deep ultramarine-blue, lightly tinged pale purple; eye deep purplish-blue.

Elatum Type.

SINGLE.

Flowers white.

ANGEL'S BREATH (Barber).—4 feet. Spike 20 inches, blunt; side spikes many, strong; flowers cup-shaped, single, 2 inches, dull white; eye white, streaked brown.

Flowers pale blue.

Mrs. Townley Parker (Raised and sent by Messrs. Blackmore & Langdon, Bath), A.M. June 26, 1933.—7 feet; spike 2 feet long; side spikes many, of medium vigour; flowers 1\frac{3}{4} to 2 inches, pale skyblue; eye white. [A.M. 1925.]

ANNE HATHAWAY (Hewitt).—5 feet. Spike 18 to 22 inches long; side spikes many, strong; flowers arranged very closely on spike, 2 to 2½ inches, bright clear forget-me-not blue; eye large, white.

AFGHAN QUEEN (Hewitt).—6 feet. Spike 20 to 30 inches long; side spikes many, strong; flowers rounded, 2½ inches, bright azure-blue faintly tinged mauve; eye creamy-white and brownish. Late flowering.

Flowers violet and purple.

Violet Queen (Raised by Mr. Watkin Samuel of Wrexham, and sent by Messrs. Hewitt of Solihull), A.M. June 26, 1933.—8 feet; spike somewhat crowded, 2½ to 3 feet long; side spikes many, strong; flowers 2½ inches, deep gentian-blue, margins broadly edged purple; eve blackish-brown. [A.M. 1925.]

SEMI-DOUBLE.

Pale blue.

Lady Emsley Carr (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—6 feet; spike tapering, 18 to 32 inches long; side spikes many, strong; flowers 21/2 to 23/2 inches, clear pale sky-blue; eye black.

Flowers dark blue.

Blue Bird (Introduced and sent by Messrs. Tucker of Oxford), A.M. June 26, 1933.—7 feet; spike somewhat loose, 21 feet long; side spikes many, of medium vigour; flowers 17 inch, deep azureblue; eye brown, streaked azure-blue. [A.M. 1925.]

Lady Holt (Blackmore & Langdon).—5 feet; spike tapering, 1½ to 2 feet long; side spikes many, strong; flowers 2½ inches, bright forget-me-not blue, inner petals faintly tinged mauve at tips; eye white.

Blue Gown (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—5 feet; much branched; spike 18 to 30 inches long; side spikes very many, strong; very free flowering; flowers 2½ inches, bright rich azure-blue, inner petals faintly tinged mauve; eye small, black. Very suitable for garden decoration.

Flowers mauve.

Mrs. Shirley (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—7 feet; spike somewhat tapering, close, 2½ feet long; side spikes many, strong; flowers 13 to 2 inches, very pale lilac lightly flushed pale forget-me-not blue; eye creamy-white. [A.M. 1925.]

LORD OF JUNE (J. B. Vanderschoot).—6½ feet; spike tapering, 18 to 30 inches long; side spikes many, strong; flowers 21 inches, mauve; eye white.

Lorenzo da Medici (Jones, Ruys), A.M. June 26, 1933.—6 feet. Spike somewhat tapering, 2 to $2\frac{1}{2}$ feet long; side spikes medium; flowers 2 to 21 inches, outer petals pale forget-me-not blue flushed mauve, inner mauve; eye creamy-white. [A.M. 1912.]

Flowers pale blue and mauve shades.

Lady Eleanor (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—8 feet; very vigorous; spike tapering, 2 to 31 feet long; side spikes many, strong; flowers loosely formed, 21 to 3 inches, pale forget-me-not blue tinged pale mauve; eye white and mauve.

Dawn (Raised and sent by Mr. W. Spencer of Milford, Surrey), A.M. June 26, 1933.—6 feet; spike 18 to 28 inches long, tapering; side spikes many, strong; flowers 21/2 to 3 inches, outer petals pale silvery sky-blue, inner overlaid with mauve; eye dark brown striped, whitish-mauve. [A.M. 1929.]

EILEEN MAY ROBINSON (Robinson).-41 feet; spike 18 to 28 inches long, tapering; side spikes many, strong; flowers 2½ inches, sky-blue broadly edged pinkish-mauve; eye white. Millicent Blackmore × Cambria.

LADY BARBARA (Blackmore & Langdon).—5 feet; spike 1½ to 2 feet long; side spikes many, strong; flowers 2½ inches, bright forget-me-not blue, inner petals pale mauve; eye white and pale mauve. A darker and richer shade than 'Lady Eleanor.'

Jean (Raised by Mr. F. W. Smith, sent by Messrs. Bakers), A.M. June 26, 1933.—7 feet; spike close, 2 feet long; side spikes many, of medium vigour; flowers 13 to 2 inches, outer petals sky-blue, inner flushed pale mauve; eye white. [A.M. 1925.]

Ariel (Raised and sent by Messrs. H. J. Jones of Lewisham), A.M. June 26, 1933.—6½ feet; spike close, 2 feet long; side spikes many. rather weak; flowers 13 inch, outer petals pale forget-me-not blue, margins flushed pale mauve, inner pale mauve; eve white, streaked pale mauve.

Mrs. Newton Lees (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—51 feet; spike 18 to 22 inches long. tapering; side spikes many, strong; flowers 17 to 21 inches, outer petals pale sky-blue, inner pale mauve; eye brownish, striped pale mauve. [A.M. 1929.]

Winsome (Raised and sent by Messrs H. J. Jones), A.M. June 26, 1933.—6½ feet; spike somewhat tapering, close, 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals very pale sky-blue, inner flushed pale mauve; eye white, irregularly streaked pale mauve. [A.M. 1925.]

Mrs. Edmundson (Raised and sent by Messrs. H. J. Jones), A.M. June 26, 1933.—6 feet; spike somewhat blunt, close, 2 feet long; side spikes many, strong; flowers 21 inches; outer petals very pale skyblue, inner faintly tinged mauve; eye white. [A.M. 1925.]

MIDSUMMER (J. B. Vanderschoot).—5 feet; spikes 18 to 26 inches; side spikes many, strong; flowers 2½ inches, outer petals forget-me-not blue, inner pale mauve, tinged pale blue at white eye.

Queen of the Belgians (Raised by Mr. Ferguson, introduced by Messrs. Waterer, Son & Crisp, sent by Mr. Gifford), A.M. June 26, 1933.—54 feet; spike 2 feet long; side spikes many, strong; flowers 3 inches, outer petals pale forget-me-not blue, inner pale mauve, margins blue; eye white. [A.M. 1925.]

Nora Ferguson (Raised by Mr. Ferguson, sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—6 feet; spike somewhat tapering, crowded, 21 to 3 feet long; side spikes many, strong; flowers 21 inches; outer petals sky-blue, inner flushed pale mauve; eye white. [A.M. 1925.]

Miss W. B. Mackintosh (Raised and sent by Mr. T. Bones), H.C. June 26, 1933.—6½ feet; spike crowded, 2 feet long; side spikes many, of medium vigour; flowers 2 to 21 inches, outer petals pale mauve, margins flushed forget-me-not blue, inner mauve, margins flushed blue; eve white. [H.C. 1925.]

David (Raised by Mr. F. W. Smith and sent by Messrs. Bakers), H.C. June 26, 1933.—7 feet; spike somewhat crowded, 2 to 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale forgetme-not blue, margins flushed pale mauve, inner mauve; eye white.

Flowers dark blue and dark mauve.

F. W. Smith (Raised by Mr. F. W. Smith and sent by Messrs. Bakers, Jones, Ruys), H.C. June 26, 1933.—8 feet; spike somewhat loose, 2½ to 3 feet long; side spikes many, strong; flowers 2 inches, bright azure-blue flushed deep mauve; eye white.

LADY ROSE (Blackmore and Langdon).—6 feet; spike tapering, 22 to 30 inches long; side spikes many, strong; flowers rounded, basin shaped, 2½ inches diameter, outer petals rich azure-blue, inner deep mauve, lightly tinged at margins azure-blue; eye white.

Tom Hewitt (Raised and sent by Messrs. Hewitt), A.M. June 26, 1933.—6½ feet; very vigorous; spikes freely produced, 2 to 3 feet long; side spikes many, strong; flowers 2½ to 2¾ inches, outer petals bright clear ultramarine-blue, inner mauve tinged azure-blue; eye black.

D. B. Crane (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—6½ feet; spike 28 to 36 inches long, tapering; side spikes many, strong; flowers 2½ inches, outer petals ultramarine-blue, inner deep mauve; eye small, white.

DUCHESS OF YORK (Hewitt).—5 feet; spike tapering, 18 to 30 inches long; side spikes many, strong; flowers 2 to 2½ inches, deep manye, outer petals deep rich ultramarine-blue, margins tinged manye; eye black.

Philip Butler (Raised and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—5½ feet; spike 18 to 22 inches long; side spikes many, strong; flowers 1½ to 2 inches; purplish-mauve, outer petals azure-blue; eye white, striped purplish-mauve.

NORAH PHILLIPS (Hewitt).—5½ feet; spike 20 to 28 inches, flowers widely spaced; side spikes many, strong; flowers 2½ inches, deep rich ultramarine-blue, edged deep purplish-mauve; eye black.

MERSTHAM EMPEROR (Wells).—5½ feet; spike 12 to 22 inches; side spikes many, strong; flowers 2½ to 2½ inches, inner petals purplish-mauve; outer ultramarine-blue margins tinged purplish-mauve; eye black.

Flowers violet and purple shades.

Rev. E. Lascelles (Raised by Mr. Walters and sent by Messrs. Blackmore & Langdon), A.M. June 26, 1933.—6½ feet; spike somewhat loose, 2 to 2½ feet long, tapering; side spikes many, of medium vigour; flowers 2 inches, outer petals azure-blue, inner pale violet-purple; eye large, white, streaked violet-purple. [A.M. 1925.]

RUBY WEEKS (Weeks).—5 feet; spike tapering, 18 to 22 inches long; side spikes many, strong; flowers 2 inches, inner petals bright royal-purple, outer rich azure-blue broadly edged royal-purple; eye white and royal-purple.

rich azure-blue broadly edged royal-purple; eye white and royal-purple.

First of All (J. B. Vanderschoot).—6 feet; spike 12 to 24 inches; side spikes few, weak, flowers very close on spikes; flowers 1½ to 1½ inch, inner petals pale purple, outer azure-blue; eye blackish. Early flowering.

Emperor (Raised and sent by Mr. W. Spencer), H.C. June 26, 1933.— 6½ feet; spike tapering, 1½ to 2 feet long; side spikes many, strong; flowers 2½ inches, ultramarine-blue edged royal-purple; eye creamy-

Purple Knight (J. B. Vanderschoot).—6 feet; spike ½ to 2 feet long; side spikes many, strong; flowers 2½ to 2½ inches, inner petals deep purplish-mauve, outer azure-blue, margins tinged deep mauve; eye white and deep mauve.

Wales (Spencer).—6½ feet; spike tapering, 1½ to 3 feet long; side spikes many, strong; flowers 2 inches, azure-blue broadly edged royal-purple; eye

white.

Twilight (Raised by the Rijnstroom Nurseries, introduced and sent by Messrs. J. B. Vanderschoot, Holland), H.C. June 26, 1933.—6 feet; spike tapering, 20 to 36 inches long; side spikes many, strong; flowers 21 inches, inner petals purple, outer deep rich ultramarineblue; eye white.

Rose Marie (Raised by Mr. W. Samuel, introduced and sent by Messrs. Hewitt), A.M. June 26, 1933.—6½ feet; spike tapering 1½ to 3 feet long; side spikes many, strong; flowers very close on spikes, 2½ inches, outer petals deep ultramarine-blue, inner rich purplishmauve; eye black. Resistant to mildew.

Kirchenfenster (J. B. Vanderschoot).— $6\frac{1}{2}$ feet; spike narrow, $1\frac{1}{2}$ to $2\frac{1}{2}$ feet long; side spikes many, weak; flowers very close on spikes, $1\frac{5}{2}$ to $1\frac{7}{4}$ inch, outer petals deep ultramarine-blue, inner deep purple; eye blackish. Resistant to mildew.

BEARDED IRISES AT WISLEY, 1933.

This report is drawn up on the same lines as those of previous years, and follows those which appeared in this Journal, vols. 53, pp. 116-160; 55, pp. 132-140; 56, pp. 75-96; 57, pp. 70-74; and 58, pp. 199-203, except that the varieties to which Awards have been made are printed in larger type in order to draw greater attention to them, and a new category has been added of varieties discarded. Those named as discarded will no longer be retained at Wisley.

The lists taken together show which varieties among the very many which have been grown in England are regarded by the Joint Iris Committee (acting for the Royal Horticultural Society and the Iris Society) as being most suited for garden cultivation in this country (and to these Awards have been made), and new varieties of promise, but which have not yet proved themselves sufficiently to receive an Award. These two classes together form the Standard Collection against which new varieties added and grown at Wisley after selection at Vincent Square are judged.

Below these comes the varieties in the General Collection and, lower in the grading still, the discarded varieties which in the opinion of the Joint Committee no longer merit a place in English gardens, their place having been taken by varieties accessible to all the gardening public.

Descriptions of all varieties added to the Standard collection are given as they qualify for inclusion there.

AWARDS, DESCRIPTIONS, AND NOTES.

CLASS I. WHITE OR NEARLY WHITE VARIETIES.

Yves Lassailly, A.M. (1933).—Described, Journal R.H.S., 58, 199.

The following varieties have been added for future judgment:

POLAR KING (Donahue).

SELENE (Connell).

The following varieties have been relegated to the General Collection:

ATHENE: 28 inches; May-June. (53, 119.) *
MILKY WAY: 36 inches; June. (53, 119.)
WHITE QUEEN: 24 inches; May-June. (53, 119.)
WHITE STAR: 36 inches; May-June. (57, 70.)

The following variety has been discarded:

ANTARÉS. (56, 96.)

CLASS II A a (1).

The following variety has been added for future judgment: CIRRUS (Burton).

^{*} The figures in brackets refer to the volume and page in this JOURNAL where the last mention of the variety occurred. They show, among other things, the time the variety has been under trial.

The following varieties have been relegated to the General Collection:

AKSARBEN: 24 inches; June. (53, 122.) DIMITY: 32 inches; June. (53, 121.)

The following variety has been discarded:

MIMI. (53, 121.)

CLASS II A b (1).

The following variety has been relegated to the General Collection:

KITTY REUTHE: 24 inches; May-June. (58, 122.)

CLASS II A b (2).

JANE AUSTIN .- Vigorous and of rapid increase, with erect foliage, 24 inches high. Flower stems 38 inches, erect, 8-flowered, branches short. Flowers close, of medium size, well-proportioned, stiff. Standards domed, $2\frac{3}{8} \times 2$ inches, white, heavily spotted and suffused rosy-lilac. Falls straight-hanging, $2 \times 1\frac{1}{4}$ inches, creamy-white, margins speckled rosy-lilac. Beard white, upper half of hairs yellow. Flowering for three weeks from June 10. Raised and sent by the late Miss V. Insole. Steepway × (Aphrodite × Susan Bliss). (57, 70.)

The following variety has been relegated to the General Collection:

Parisiana: 26 inches; June. (53, 123.)

The following variety has been discarded:

Byron. (53, 123.)

CLASS II B.

The following variety has been relegated to the General Collection: SEEDLING 43/27/15 (Long): 26 inches; June. (56, 89.)

CLASS III B.

The following variety has been relegated to the General Collection: B. Y. Morrison: 28 inches; June. (53, 124.)

The following variety has been discarded: COROT. (57, 73.)

CLASS IV a.

CYDNUS.—Vigorous and of rapid increase, with spreading foliage, 28 inches CYDNUS.—Vigorous and of rapid increase, with spreading foliage, 23 inches high. Flower stems 32 inches high, erect, somewhat zigzag, 7-flowered; branches short. Flowers large, stiff, well-proportioned. Standards domed, oval, 3 × 2½ inches, lavender. Falls straight-hanging, spoonshaped, 3 × 2½ inches, bright violet-purple, broadly edged lavender, veins on haft distinct, brownish. Beard pale yellow. Flowering for twelve days from June 12. Raised 1929, and sent by Messrs. R. Wallace, Tunbridge Wells, Kent. (56, 90.)

Autocrat.—Vigorous and of rapid increase, with erect foliage, 20 inches high. Flower stems 30 inches high, erect, zigzag, branches short, 6- to 8-flowered. Flowers of medium size, stiff. Standards cupped, 2½ × 1½ inches, bale lavender. Falls somewhat drooping. 1¾ × 1¾ inch. violet. margins whitish.

pale lavender. Falls somewhat drooping, $1\frac{3}{4} \times 1\frac{3}{4}$ inch, violet, margins whitish, greyish towards the haft, veins on haft distinct. Beard white, tips of hairs bronzy. Flowering for sixteen days from May 28. Raised by Mrs. F. E. Cleveland of U.S.A. and sent by The Orpington Nurseries, Orpington, Kent. (53, 127.)

The following varieties have been relegated to the General Collection:

Ann Page: 28 inches; May-June. (53, 127; A.M. 1920.) EGLAMOUR: 20-24 inches; May-June. (53, 126.)

MERCUTIO: 28 inches; June. (53, 127.) NEPTUNE: 36 inches; June. (53, 126.) SALOMÉ: 30 inches; May-June. (57, 71.)

The following varieties have been discarded:

Blue Lagoon. (56, 90.) Papillon. (57, 71.) Samothrace. (56, 90.) Simone Vaissière. (57, 71.) Vanlo. (57, 71.)

CLASS IV b.

PALAEMON.—Vigorous and of rapid increase, with erect foliage, 20 inches high. Flower stems erect, somewhat zigzag, 32 inches high, 8-flowered, branches short. Flowers large, stiff, well-proportioned. Standards domed, oval, $2\frac{3}{4} \times 2\frac{1}{8}$ inches, pale lavender-violet. Falls drooping, $2\frac{1}{4} \times 2$ inches, pale violet-purple, veins on haft distinct, brownish. Beard white, tips of hairs yellow. Flowering for ten days from May 30. Raised 1929 and sent by Messrs. R. Wallace, Tun-bridge Wells, Kent. (56, 91.) This is not to be confused with Palemon (53, 142). FANDANGO.—Plant vigorous and of rapid increase, with erect foliage, 20 inches

high. Flower stems weak, straight, 42 inches high, 8-flowered, branches of medium length. Flowers large, well-proportioned, stiff. Standards domed, 3 × 2½ inches, pale lavender-violet, base tinged bronze. Falls straight-hanging, 2½ × 2½ inches, pale violet-purple, margins paler, haft veined brown. Beard pale orange. Flowering for thirteen days from May 27. Raised and sent by Messrs. Cayeux et le Clerc. (57, 73.)

The following varieties have been added for future judgment:

Brahmin (Rollo Meyer). ANTRIM (Morrison). Blue Banner (Kirkland). VELVET KING (?).

The following varieties have been relegated to the General Collection:

APOLLO: 30 inches; May-June. (56, 90.) CYPRIANA SUPERBA: 30 inches; May-June. (58, 130.)

MAHARANA: 36 inches; June. (56, 91.) VASHTI: 38 inches; June. (56, 91.)

DOMINION: 28 inches; May-June. (53, 130; A.M. 1916.)

The following varieties have been discarded:

SIRDAR. (53, 129.) TARCHON. (53, 130.) Moa. (53, 130.) ORIENTAL. (53, 130.) SHALBRUZ. (53, 130.)

CLASS IV c.

The following varieties have been added for future judgment:

AKT (Rollo Meyer). SEEDLING 1/E.57 (Burgess).

The following varieties have been relegated to the General Collection:

HOCHELAGA: 36 inches; June. (55, 135.) HOURI: 36 inches; June. (55, 135.) IEPALL: 22 inches; May-June. (53, 133.)

The following varieties have been discarded:

BRILLIANT. (53, 133.) FRAGONARD. (57, 71.) Luciane. (57, 71.) Princess. (53, 133.) HARRIET PRESBY. (53, 133.)

CLASS IV d.

ROSE MARIE.—Plant vigorous and of rapid increase, with erect foliage, 22 inches high. Flower stems 36 inches, erect, 8-flowered, branches of medium length. Flowers large, well-proportioned, stiff. Standards domed, $2\frac{1}{8} \times 2\frac{1}{2}$ inches, bright violet-purple. Falls drooping, $2\frac{1}{8} \times 2\frac{3}{8}$ inches, circular, rich deep royal-purple, margins paler, veins on white, distinct, on haft. Beard white, tips of hairs pale yellow, apex bronze. Flowering for fourteen days from June 18. Raised 1928 and sent by Messrs. Cayeux et le Clerc. (57, 72.)

The following varieties have been added for future judgment:

ARABELLA (Rollo Meyer). Rose Dominion (Connell). MORNING GLORY (Kirkland).

The following variety has been relegated to the General Collection:

Esplendido: 30 inches; June. (53, 134.)

The following varieties have been discarded:

Mons. Hautefeuille. (53, 134.) Peerless. (53, 134.)

CLASS V a.

The following variety has been added for future judgment: Bunny (Stern).

The following varieties have been relegated to the General Collection:

AQUARELLE: 24 inches; June. (56, 92.)

AVALON: 30-34 inches; May-June. (53, 137.)

BELLORIO: 32 inches; May-June. (55, 136.)

GREY LADY: 30-34 inches; May-June. (56, 92.)

MONS. MASSE: 36 inches; May-June. (53, 137.)

MOTHER OF PEARL: 36-40 inches; May-June. (53, 136.)

ODORATISSIMA: 36 inches; May-June. (53, 136.)

The following varieties have been discarded:

Gargantua. (**56**, 90.) Isabey. (**57**, 72.) PTE. W. A. LOGAN, M.M. (53, 127.) Purple Haze. (57, 72.) Salawat. (53, 127.) Swatara. (53, 127.) JACQUELINE GUILLOT. (57, 72.) PALLIDA OCTAVIUS. (53, 141.) Pallida Sheldrake. (53, 137.) SYBILA. (53, 127.) PLUTO. (53, 152.)

CLASS V b.

The following varieties have been added for future judgment:

Blue Danube (Rollo Meyer). TASMAN (Burgess). MELDORIC (Ayres).

The following varieties have been relegated to the General Collection:

ARSACE: 26 inches; June. (53, 139.) BLUE BOY: 18 inches; May-June. (53, 139.) VENETIA: 24 inches; May-June. (53, 139.)

CLASS V c.

The following varieties have been added for future judgment:

AIRY DREAM (Sturtevant). DAYDREAM (Sturtevant). CONSTANCE MEYER (Rollo Meyer). PINK LOTUS (Neel).

The following varieties have been relegated to the General Collection:

Dr. Chas. H. Mayo: 30 inches; June. (53, 127.) Dog Rose: 44 inches; June. (57, 72.) ELINOR BLOSSOM: 17 inches; May-June. (53, 139.)

The following variety has been discarded: POWHATTAN. (53, 139.)

CLASS V d.

The following varieties have been added for future judgment:

SOANNA (Stern). DAUNTLESS (Connell). EVELYN BENSON (Murrell).

The following variety has been relegated to the General Collection:

SAN LUIS REY: 33 inches; June. (56, 93.)

The following varieties have been discarded:

MARYLISE. (57, 73.) RUGAJO. (56, 93.) PERRY'S FAVOURITE. (56, 93.)

CLASS VI a (1).

HORACE VERNET.—Plant of moderate vigour and of rapid increase, with erect foliage, 18 inches high. Flower stems 24 inches high, erect, zigzag, 8-flowered, branches very short. Flowers very close, of medium size, stiff, well-proportioned.

Standards domed, oval, $2\frac{1}{4} \times 1\frac{3}{4}$ inches, dull smoky-lavender, base bronze. Falls somewhat drooping, 2 x 11 inches, bright clear lavender-blue, veins pale brownish, distinct on haft. Beard bright orange. Flowering for fifteen days

brownish, distinct on haft. Beard bright orange. Flowering for fifteen days from June 1. Raised and sent by Messrs. Cayeux et le Clerc. (57, 73.)

Allure.—Plant vigorous and of rapid increase, with erect foliage, 16 inches high. Flower stems 32 inches high, erect, zigzag, 8-flowered, branches short. Flowers of medium size, well-proportioned, stiff. Standards domed, $2\frac{1}{4} \times 1\frac{3}{4}$ inches, very pale creamy-lavender, base yellowish. Falls drooping, $2 \times 1\frac{3}{4}$ inches, very pale lavender-mauve, margins at beard and on haft pale yellow. Beard pale orange. Flowering for fourteen days from June 1. Raised and sent by The Orpington Nurseries, Orpington, Kent. Imperator × Shekinah. (58, 139.)

The following varieties have been added for future judgment.

Alcina (Connell). Hassan (Murrell). NEPENTHE (Connell).

The following varieties have been relegated to the General Collection:

FARANDOLE: 26 inches; June. (57, 73.) GÉRICAULT: 26 inches; June. (57, 72.) MARQUISETTE: 36 inches; June. (57, 73.) OLIVE MURRELL: 36 inches; June. (53, 142.) SENORITA: 42 inches; May-June. (57, 73.)

The following varieties have been discarded:

DR. BLESS. (53, 145.) FRANCHEVILLE. (57, 73.) GERALDINE. (53, 142.)

CLASS VI a (2).

The following varieties have been added for future judgment:

AUBADE (Connell). MME. RECAMIER (Washington). ORIENT PEARL (Murrell).

RHEA (Williamson). Rose Ash (Morrison).

The following variety has been relegated to the General Collection: DISTINCTION: 36 inches; June. (57, 73.)

The following variety has been discarded: SARABANDE. (53, 143.)

CLASS VI b.

The following variety has been discarded: CAMBUSCAN. (57, 73.)

CLASS VI c (1).

Mrs. Valerie West, F.C.C. 1933.—Vigorous and of rapid increase, with erect foliage, 26 inches high. Flower stems erect, straight, 38 inches high, 9-flowered, branches of medium length. Flowers large, stiff, well-proportioned, close. Standards somewhat cupped, $2\frac{5}{8} \times 2\frac{1}{4}$ inches, smoky pale plum, base yellowish. Falls drooping, almost circular, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, rich velvety plum-purple, veins brownish at beard and on haft. Beard bright yellow. Flowering for fourteen days from June 16. Raised by the late Mr. A. J. Bliss and sent by Messrs. R. W. Wallace. Introduced in 1925. (56, 94.)

Rhodes, A.M. 1933.—Vigorous, and of rapid increase, with erect, glaucous-green foliage, 20 inches high. Flower stems 36 inches high, erect, somewhat zigzag, 10-flowered, branches short. large, well-proportioned, stiff. Standards domed, 2½ × 2½ inches,

clear bright rich reddish-purple, base cream. Falls drooping, $2\frac{1}{4} \times 2$ inches, rich velvety red-purple, distinct brownish veins on white on haft. Beard orange. Flowering for twelve days from June 4. Raised and sent by Messrs. R. W. Wallace, Tunbridge Wells, Kent. (56, 93.)

Gloaming, A.M. 1933.—Vigorous, and of rapid increase, with erect foliage, 16 inches high. Flower stems erect, 20 inches high, 3-flowered, branches short. Flowers of medium size, well-proportioned, stiff. Standards domed, $2\frac{1}{4} \times 1\frac{7}{8}$ inches, smoky wine-purple. Falls straight-hanging, $1\frac{1}{2} \times 1\frac{5}{8}$ inch, rich reddish wine-purple, margins paler, towards beard and on haft margins yellow. Beard bright orange. Flowering for fourteen days from May 14. A May-flowering intermediate variety. Raised and sent by the Orpington Nurseries. Introduced 1929. Dejazet × Orange Queen. (55, 139.)

Don Juan.—Plant vigorous and of rapid increase, with erect foliage, 24 inches high. Flower stems 36 inches high, erect, 8-flowered, branches of medium length. Flowers close, large, well-proportioned, stiff. Standards domed, 3 × 2½ inches, dull smoky wine-purple, base yellowish. Falls drooping, 2½ × 2 inches, rich velvety red-purple, margins paler. Beard white, upper half of each hair yellow, apex bronze. Flowering for fourteen days from May 23. Raised and sent by Messrs. Cayeux et le Clerc. Introduced 1928. (57, 74.)

Petrea.—Plant moderate and of rapid increase, with erect foliage, 22 inches high. Flower terms 20 inches high erect. 6 flowered branches chort.

Petrea.—Plant moderate and of rapid increase, with erect foliage, 22 inches high. Flower stems 30 inches high, erect, 6-flowered, branches short. Flowers of medium size, well-proportioned, stiff. Standards cupped, 1½ x 1½ inch, bright clear mahogany-red. Falls drooping, 1½ x 1½ inch, deep rich velvety mahogany-red, veins distinct on haft. Beard bright orange. Flowering for fifteen days from June 4. Raised and sent by Messrs. R. W. Wallace. (56, 93.)

The following varieties have been added for future judgment:

Banderole (Morrison). Ecstasy (Morrison). Esamillo (Morrison). JEB STUART (Washington). PENDELL (Ayres). SEVILLE (Morrison).

The following varieties have been relegated to the General Collection:

Albiero: 38 inches; June. (56, 94.)
Allies: 26 inches; June. (53, 145.)
CAYLUS: 30 inches; June. (53, 145.)
Fire God: 32 inches; May-June. (57, 73.)
Le Corrège: 36 inches; June. (53, 145.)
Nêne: 38 inches; June. (57, 71.)
OPERA: 26 inches; June. (53, 145.)
ROSE MADDER: 38 inches; June. (53, 145.)
STEEPWAY: 32 inches; May-June. (55, 138.)

The following varieties have been discarded:

Amanullah. (57, 72.) Gernez. (53, 145.) Mons. Boyer. (58, 145.) Samos. (56, 94.)

CLASS VI c (2).

Zwanenburg, A.M. 1933.—Described, R.H.S. JOURNAL, 53, p. 146. Mary Geddes, A.M. 1933.—Vigorous, and of rapid increase, with erect foliage, 20 inches high. Flower stems erect, 32 inches high, 8-flowered, branches short. Flowers large, well-proportioned, stiff. Standards domed, $2\frac{5}{8} \times 2\frac{1}{8}$ inches, clear pale coppery-buff with a faint pinkish overlay, base orange. Falls straight-hanging, $2\frac{1}{4} \times 2$ inches, clear pale reddish-buff, margins broadly edged pale smoky-buff, veins pale brown, distinct on yellow at haft. Beard old gold. Flowering for fourteen days from June 2. Raised by Mr. T. A. Washington and

Mrs. J. H. Stahlman. Introduced by the Fairmount Iris Gardens, Lowell, U.S.A., and sent by Mrs. E. A. S. Peckham. Dejazet X Cardinal.

KING MIDAS.—Moderately vigorous and of rapid increase, with erect foliage, 20 inches high. Flower stems 26 inches, erect, 6-flowered, branches very short. Flowers very close, large, well-proportioned, stiff. Standards domed, $2\frac{1}{2} \times 2$ inches, coppery-bronze, base bronze. Falls straight-hanging, $2\frac{1}{2} \times 2\frac{1}{4}$ inches, bright pale rich reddish-wine, margins paler, veins pale brown on yellow on haft. Beard orange. Flowering for sixteen days from May 23. Raised and sent by Mr. Franklin B. Mead, U.S.A. Introduced by The Orpington Nurseries. Dejazet \times Lent A. Williamson. (58, 202.)

The following varieties have been added for future judgment:

AMBER WAVE (Murrell). PICADOR (Morrison).

TALISMAN (Murrell).

The following varieties have been relegated to the General Collection:

GREUZE: 32 inches; June. (57, 74.)

MME. CHOBAUT: 30 inches; May-June. (53, 146.)

OPHELIA (Cayeux et le Clerc): 30 inches; June. (56, 94.)

SANDRINE: 30 inches; June. (57, 74.)

SEEDLING 27/27/18 (LONG): 24 inches; June. (56, 94.)

The following varieties have been discarded:

Gustave Courbet. (57, 74.) Le Grand Ferre. (56, 93.)

Louis David. (57, 74.) WRAITH. (56, 94.)

CLASS VII b.

WATTEAU.-Plant vigorous and of rapid increase, with erect foliage, 22 inches high. Flower stems 36 inches high, erect, 8-flowered, branches short. Flowers large, close, well-proportioned, stiff. Standards domed, $2\frac{1}{8} \times 1\frac{7}{10}$ inches, butter-cup-yellow, base tinged pale brown. Falls almost horizontal, $1\frac{3}{8} \times 1\frac{7}{10}$ inch, pale bluish-lavender, margins pale yellow, veins brownish and distinct on haft. Beard orange. Flowering for fourteen days from May 28. Raised and sent by Messrs. Cayeux et le Clerc. Introduced 1929. (57, 74.)

The following variety has been added for future judgment:

RAFI (Murrell).

The following varieties have been relegated to the General Collection:

GAGUS: 24 inches; May-June. (53, 148; A.M. 1916.) IROQUOIS: 28 inches; June. (57, 74.) SALONIQUE: 28 inches; May-June. (53, 148.)

The following varieties have been discarded:

J. F. MILLET. (57, 74.) SOLANA. (56, 95.)

CLASS VII d.

DÉTAILLE.—Vigorous and of rapid increase, with erect foliage, 22 inches high. Flower stems 28 inches high, erect, 8-flowered, branches very short. Flowers large, crowded, stiff, well-proportioned. Standards domed, $2\frac{1}{2} \times 1\frac{3}{2}$ inches, pale buttercup-yellow. Falls drooping, $2 \times 1\frac{3}{4}$ inches, pale reddish-chestnut, narrowly edged pale yellow. Beard bright orange. Flowering for fourteen days from June 1. Raised and sent by Messrs. Cayeux et le Clerc. Introduced 1926. (57, 74.)

The following variety has been added for future judgment:

No. 2/E. 53 (Burgess).

The following varieties have been relegated to the General Collection:

PAUL BAUDRY: 22 inches; June. (57, 74.) Rosa Bonheur: 26 inches; June. (57, 74.) THRUDWANG: 32 inches; June. (56, 95.) TRISTE: 30 inches; May-June. (58, 95.)

CLASS VIII a.

Nicolas Poussin, A.M. 1933.—Described, R.H.S. Journal, 58, p. 203.

Sunbeam.—Plant vigorous and of rapid increase, with erect foliage, 16–18 inches high. Flower stems erect, 20 inches high, 2-flowered, branches short. Flowers of medium size, close, well-proportioned, stiff. Standards domed, $2\frac{1}{4} \times 1\frac{3}{4}$ inches, clear soft yellow, faintly veined brown at base. Falls incurved, circular, $1\frac{1}{2} \times 1\frac{1}{2}$ inch, soft clear yellow tinged greenish, veins distinct, greenish-yellow on haft. Beard yellow, apex orange. Flowering for nineteen days from May 18. An intermediate variety. Raised and sent by The Orpington Nurseries. Introduced

1927. Dejazet × Orange Queen. (55, 140.)
RAYO DE SOL.—Vigorous and of rapid increase, with erect foliage, 24 inches high. Flower stems erect, zigzag, 32 inches high, 8-flowered, branches of medium length. Flowers large, widely spaced, stiff, well-proportioned. Standards cupped, 2½ × 2 inches, buttercup-yellow. Falls drooping, 2 × 1½ inches, deep lemon-yellow, veins distinct at beard and on haft. Beard orange. Flowering for fifteen days from May 24. Raised by Mr. S. B. Mitchell. Introduced 1920 by Messrs. Carl Salbach, California, U.S.A., and sent by G. L. Pilkington,

Esq., of Liverpool. (58, 203.)

The following variety has been added for future judgment:

GOLDEN HIND (Chadburn).

The following varieties have been relegated to the General Collection:

BASTIEN LEPAGE: 28 inches; June. (57, 74.)
CANADIAN GOLD: 24 inches; June. (55, 140.)
DELACROIX: 26 inches; June. (57, 74.)
MRS. NEUBRONNER: 20 inches; June. (53, 150.)
PHECDA: 26 inches; June. (56, 95.)
SHERWIN WRIGHT: 22 inches; June. (53, 150.)
VIRGINIA MOORE: 20 inches; June. (53, 150.)

The following variety has been discarded:

AUREA. (53, 150.)

CLASS VIII b.

Moonbeam, A.M. 1933-Vigorous, and of rapid increase, with erect foliage, 16 to 18 inches high. Flower stems 20 to 22 inches high, erect, 3-flowered, branches short. Flowers close, of medium size, well-proportioned, stiff. Standards domed, $2\frac{3}{8} \times 2$ inches, cream, base shaded greenish-yellow. Falls straight-hanging, $1\frac{7}{8} \times 2$ inches, cream, tinged and veined greenish-cream, veins distinct on haft. Beard cream, apex orange. Flowering for eighteen days from May 18. An intermediate variety. Raised and sent by The Orpington Nurseries, Orpington, Kent. Introduced 1927. Dejazet × Orange Queen. (55, 140.)

The following varieties have been added for future judgment:

DESERT GOLD (Kirkland).

PERVANEH (Murrell).

The following varieties have been relegated to the General Collection:

ALIQUIPPA: 30 inches; June. (58, 203.)
CHASSEUR: 24 inches; May-June. (53, 151.)
DAFFODIL: 36 inches; June. (55, 140.)
PRIMROSE: 30 inches; June. (56, 96.)
SOLEDAD: 12 inches; May. (53, 151.)

The following varieties have been discarded:

ETTA. (53, 151, A.M. 1916.) QUEEN FLAVIA. (53, 151.) LEUTHA. (56, 96.)

NEW AND UNCLASSIFIED VARIETIES.

SHOT SILK (Murrell). DRESDEN CHINA (Baker). ROSE PETAL (Murrell).

PYRETHRUMS AT WISLEY, 1932-33.

One hundred and sixty-seven stocks representing ninety-two varieties distributed over nineteen classes were grown in the trial. Three plants of each stock were planted on April 4, 1932. Flowering commenced in early May, and the time of flowering of each variety is indicated in the descriptions given below. The plants were grown without support. They were examined by the Floral Committee A on several occasions and judged on June 10, 1932, and June 1, 1933.

The group divisions given below are into colours and form of flower, singles, doubles and anemone-flowered varieties being distinguished.

Varieties to which Awards were given are printed in large type, others in small.

AWARDS, DESCRIPTIONS, AND NOTES.

Flowers Single White.

Avalanche (Raised and sent by Mr. H. Robinson of Burbage, Hinckley, also sent by Messrs. W. H. Simpson of Birmingham and Messrs. Bath of Wisbech), A.M. June 1, 1933.—Plant vigorous, very free-flowering; flower stems stout, erect, 30 inches long; flowers 3½ inches diameter, at first tinged pink, when mature white. Flowering from May 16.

Snow White (Raised and sent by Messrs. J. Kelway of Langport), H.C. June 1, 1933.—Plant vigorous, compact; foliage with finer divisions than most; flower stems erect, 26 inches long; flowers 2½ inches diameter, white. Flowering from May 16.

CHRISTINE KELWAY (Kelway).—Plant spreading; flower stems 2½ feet long, erect, stout; flowers 2½ inches diameter, creamy-white. Flowering from May 20.

Flowers Double White.

MONT BLANC (Bath).—Plant not vigorous; flower stems 20 inches, erect; flowers 2½ inches diameter, white; ray florets drooping. Flowering from May 30.

La Neige (Raised by Messrs. V. Lemoine of Nancy, France, and sent by Messrs. Bath), H.C. June 1, 1933.—Plant compact; flowers stems 2 feet, erect, stout; flowers 3 inches diameter, white. Flowering from May 20.

Candidum Plenum (Sent by Messrs. J. Forbes of Hawick), H.C. June 1, 1933.—Plant compact; flower stems wiry, erect, 26 inches; flowers 2½ inches diameter, white, disc florets creamy-white. Flowering from May 23.

WHITE QUEEN MARY (Bath, W. H. Simpson).—Plant somewhat spreading; flower stems stout, erect, 2½ feet long; flowers 3 inches diameter, white. Flowering from May 23. Sport from 'Queen Mary.'

Victoria (Raised and sent by Mr. H. Robinson, also sent by Messrs. Bath), A.M. June 1, 1933.—Plant vigorous, spreading; flower stems stout, erect, 2\frac{1}{2} feet long; flowers 3 inches diameter, white, rays broad, somewhat drooping. Flowering very freely from May 23.

White Aster (Barr).—Plant vigorous, of somewhat spreading habit; flower stems erect, 20 inches long; flowers 21 inches diameter, dull white tinged cream.

Flowering somewhat sparsely from May 26.

White Madeleine (Bath).—Habit of 'White Aster' but flower stems erect, stout, 2½ feet long; flowers 2½ inches diameter, creamy-white. Flowering from

May 20.

YVONNE CAYEUX (Bath).—Not vigorous, of compact habit; flower stems erect, 15 inches long; flowers 3 inches diameter, creamy-white, disc florets at first pale lemon, later cream. Flowering from May 12.

QUEEN ALEXANDRA (Forbes).—Vigorous, of somewhat spreading habit;

flower stems stout, erect, 28 inches long; flowers 2 inches diameter, blush white. Flowering from May 25.

Flowers Pinkish-Apricot, Double.

NANCY (Bath).—Plant vigorous, compact; flower stems erect, stout, 16 inches long; flowers 2½ inches diameter, pale pinkish-apricot, disc florets darker; ray

florets narrow, drooping. Flowering from May 12.

CLEOPATRA (Barr).—Plant vigorous, spreading; flower stems erect, 26 inches

long; flowers 21 inches diameter, pale pinkish-apricot, disc florets apricot-buff. Flowering from May 23.

UZZIEL (Forbes).—Plant vigorous, compact; flower stems weak, drooping, 22 inches long; flowers 21 inches diameter, salmon-chamois; ray florets narrow, drooping. Flowering sparsely from May 30.

Flowers Blush-Pink, Double.

LA VESTALE (Barr, Bath).—Plant vigorous, compact; flower stems erect, 20 inches long; flowers 2% inches diameter, pale blush-pink; ray florets narrow,

ALBUM PLENUM (Forbes).—Plant vigorous, compact; flower stems weak, 22 inches long; flowers 2\frac{1}{2} inches diameter, pale blush-pink, disc florets creamywhite; ray florets narrow, drooping. Flowering from May 20.

MADAME MUNIER (Bath).—Plant vigorous, compact; flower stems erect, stiff, 18 inches long; flowers 2\frac{1}{2} inches diameter, clear blush-pink. Flowering views from May 10. very freely from May 12.

NE PLUS ULTRA (Bath).—Plant vigorous; flower stems stout, erect, 2 feet long; flowers 3½ inches diameter, blush-pink. Flowering from May 22.

BORDER MAID (Bath).—Plant vigorous, compact; flower stems erect, stiff, 28 inches long; flowers 2\frac{3}{2} inches diameter, blush-pink. Flowering from May 21.

Flowers Light Rose-Pink, Single.

DAINTY (Bath).—Plant compact; flower stems erect, wiry, 26 inches long; flowers 2½ inches diameter, pale pink; rays narrow. Flowering from May 12.

MARGARET Moor (W. H. Simpson, Barr, Bath).—Plant vigorous, spreading; flower stems drooping, 30 inches long; flowers 31 inches diameter, clear pale pink: rays very broad. Flowering from May 20.

Eileen May Robinson (Raised and sent by Mr. H. Robinson, also sent by Messrs. Bath, W. H. Simpson, Forbes, Barr of King St., Covent Garden, W.C., and Bakers of Codsall), A.M. June 1, 1933.—Plant very vigorous, of spreading habit; flower stems erect, stout, 32 inches long; flowers 3 inches diameter, pale rose-pink. Flowering very freely from May 18.

Express (Forbes).—Plant of compact habit; flower stems erect, 22 inches long; flowers 3 inches diameter, pale rose-pink. Flowering from May 12.

PHYLLIS KELWAY (Kelway).—Plant of spreading habit; flower stems stout, erect, 30 inches long; flowers 3½ inches diameter, pale rose-pink. Flowering from May 20.

Flowers Light Pink. Double.

Madeleine (Raised by Messrs. Cayeux et le Clerc of Paris, France, and sent by Messrs. W. H. Simpson and Bath), A.M. June 1, 1933.— Plant vigorous, of spreading habit; flower stems stout, 30 inches long; flowers 23 inches diameter, pale pink. Flowering from May 20. Kingston Grande sent by the Suffolk Seed Stores of Woodbridge being too much like Madeleine to warrant a distinct name shares the award.

MRS. J. J. NORFOLK (Dobbie) .- Plant vigorous, compact; flower stems erect, 11 foot long; flowers 21 inches diameter, pale pink. Flowering from May 20.

Queen Mary (Introduced by Mr. G. W. Miller of Wisbech and sent by Messrs. W. H. Simpson, Forbes, Barr, and Bath), A.M. June 1, 1933.—Plant vigorous, compact, very free-flowering; flower stems erect, stout, 2½ feet long; flowers rounded, 3½ inches diameter, bright pink. Flowering from May 18.

KINGSTON EARLY (W. H. Simpson, Suffolk Seed Stores).—Plant of compact habit; flower stems 22 inches long, erect; flowers 23 inches diameter, pink. Flowering from May 12.

SHOTOVER (Forbes).—Plant compact; flower stems erect, 20 inches long; flowers 2½ inches diameter, pale rose-pink, disc florets paler. Flowering from

Flowers Pale Pink, Anemone-Centred.

MARIE (Bath).—Plant vigorous, of erect, compact habit; flower stems erect, 22 inches long; flowers 2½ inches diameter, pale pink, disc florets cream. Flowering from May 20.

Flowers Rose-Pink Shades, Single.

CLIO (Forbes).—Plant compact; flower stems erect, 20 inches long; flowers

2½ to 3 inches diameter, pale rose-pink. Flowering from May 12.
COUNTESS OF LEITRIM (Forbes).—Plant vigorous, compact; foliage very dark green; flower stems 2 feet long, stout; flowers 3 inches diameter, pale rose-pink. Flowering from May 22.
ELLEEN KELWAY (Kelway).—Of spreading habit; flower stems 28 inches

long, stout; flowers 3 to 31 inches diameter, pale rose-pink. Flowering from May 20.

Marjorie Robinson (Raised and sent by Mr. H. Robinson, also sent by Messrs. Bath, W. H. Simpson, and Bakers), A.M. June I, 1933.—Plant vigorous, of spreading habit; flower stems stout, 21 feet long; flowers 3 to 3½ inches diameter, pale rose-pink. Flowering very freely from May 20.

MAY QUEEN (Robinson).—Plant vigorous, of spreading habit; flower stems 28 inches long; flowers 31 inches diameter, rose-pink. Flowering from May 12.

JOHN MALCOLM (Bath, W. H. Simpson).—Vigorous and of compact habit;

flower stems erect, 28 inches long; flowers 2½ inches diameter, rose-pink. Flowering from May 12.

Mrs. James Kelway (Kelway).—Plant vigorous, of compact habit; flower stems erect, weak, 20 inches long; flowers 2½ inches diameter, pale salmon-pink standard rose. Flowering from May 10. shaded rose. Flowering from May 20.

Flowers Pale Rose, Anemone-Centred.

Beauty of Stapleford (Sent by Messrs. W. H. Simpson), A.M. June I, 1933.—Vigorous and of spreading habit; flower stems erect, stout, 32 inches long; flowers pale rose, disc florets cream, 3 inches diameter. Flowering very freely from May 23.

Flowers of Rose Shades, Single,

MILLER'S SEEDLING (Bath).—Plant of compact growth; flower stems erect, 22 inches long; flowers 3 inches diameter, pale rose. Flowering from May 12.

LANGPORT KNIGHT (W. H. Simpson).—Of spreading habit; flower stems 28 inches long; flowers 2½ inches diameter, pale rose. Flowering from May 20.

Hamlet (Sent by Messrs. Forbes and Messrs. Barr), H.C. June 1, 1933.—Plant vigorous, of erect, compact habit; flower stems stout, erect, 26 inches long; flowers 3 inches diameter, rose. Flowering freely from May 20.

PRIDE OF LANGPORT (Kelway).—Of spreading habit; flower stems drooping, 28 inches long; flowers 3 inches diameter, rose. Flowering from May 12.

Punch (Forbes).—Vigorous and of compact habit, flower stems erect, wiry, 26 inches long, very leafy; flowers 2\frac{3}{4} inches diameter, rose. Flowering from May 25.

DR. PARKER (Bath).—Of compact habit; flower stems stiff, 28 inches long; flowers 3 inches diameter, rose. Flowering from May 18.

Golden Rose (Kelway).—Plant of erect, compact habit; flower stems stout, erect, 30 inches long; flowers 2½ inches diameter, clear pale salmon-rose. Flower-

ing from May 30.

AIDENNE (Barr).—Plant vigorous and compact; flower stems stout, erect, 28 inches long; flowers 23 inches diameter, deep rose-cerise. Flowering from May 12.

Flowers of Rose Shades, Double.

SENATEUR (Bath).—Vigorous and of spreading habit; flower stems drooping, 2 feet long; flowers 2½ inches diameter, pale rose. Flowering from May 20.

Andromeda (Forbes).—Vigorous and of compact habit; flower stems erect, 26 inches long; flowers 2½ inches diameter, pale rose. Flowering from May 12.

Progression (Sent by Messrs. Bath), H.C. June 1, 1933.—Plant vigorous and of spreading habit; flower stems stout, erect, 26 inches long; flowers 3 inches diameter, pale rose. Flowering very freely from May 20. Sport from 'Queen Mary.' Princess Mary sent by Messrs. W. H. Simpson was identical and shares the award.

Wilson Barrett (Sent by Messrs. J. Forbes), A.M. June 1, 1933. —Plant vigorous and very compact, erect; flower stems erect, stiff, 26 inches long; flowers 23 inches diameter, dull pale rose. Flowering freely from May 12.

HERMAN STEINGER (Forbes).—Very similar to 'WILSON BARRETT' but flowers smaller and disc florets less finely toothed. Flowering from May 20.

Alexander (Sent by Messrs. Barr), H.C. June 1, 1933.—Vigorous and of spreading habit; flower stems stout, erect, 28 inches long; flowers 23 to 3 inches diameter, deep rose. Flowering from May 23. Lycius sent by Messrs. Forbes was identical and so shares the award.

Dora (Sent by Messrs. J. Forbes), A.M. June 1, 1933.—Vigorous, of erect, compact habit; flower stems wiry, erect, 22 inches long; 184 JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.

flowers 2 to 2½ inches diameter, dull deep rose. Flowering freely from May 20.

OMAR (Forbes) .- Of compact habit; flower stems erect, 22 inches long; flowers 2½ inches diameter, dull rose-cerise, disc florets cream. Flowering sparsely from May 27.

Flowers of Dark Rose Shades, Single.

Beau Sabreur (Kelway).—Plant spreading; flower stems weak, drooping, 26 inches long; flowers 3 inches diameter, bright rich rose. Flowering from May 20.

MIRROR (Forbes).—Plant vigorous, of compact habit; flower stems erect, 15 inches long; flowers 3 inches diameter, deep rose. Flowering from May 12. LORD MILNER (Kelway) .- Of compact habit; flower stems erect, 22 inches

long; flowers 3 to 3½ inches diameter, bright deep rose. Flowering from May 21.

Cerisia (Kelway).—Vigorous and of spreading habit; flower stems erect, 28 inches long; flowers 21 to 3 inches diameter, bright deep rose. Flowering from May 20.

Duchess of York (Barr).—Of compact habit; flower stems erect, stout, 21 feet long; flowers 3 inches diameter, bright deep rose-cerise. Flowering

from May 23.

A. M. KELWAY (W. H. Simpson, Forbes, Bath).—Plant very vigorous, of spreading habit; flower stems erect, stout, 2½ feet long; flowers 3 inches diameter, bright deep rose-cerise. Flowering from May 20.

Flowers Rosy-Magenta, Single.

Albert Victor (Forbes).—Of compact habit; flower stems erect, 28 inches long; flowers 21 inches diameter, pale rosy-magenta. Flowering from May 12.

Mrs. Bateman Brown (Sent by Messrs. Bath, Barr, Forbes), H.C. June 1, 1933.—Plant vigorous, of compact, erect habit; flower stems 21 feet long; flowers 3 to 31 inches diameter, rosy-magenta. Flowering freely from May 20.

Telegraph (Forbes).—Vigorous and of compact habit; flower stems stout, erect, 30 inches long; flowers 21 inches diameter, rosy-magenta. Flowering from May 12.

STANDARD (Barr).—Plant of compact, erect habit; flower stems 2½ feet long; flowers 3 inches diameter, rosy-magenta. Flowering from May 12.

COMET (Bath, Barr, Forbes).—Of spreading habit; flower stems 28 inches long; flowers 31 inches diameter, at first rosy-crimson, later rosy-magenta. Flowering from May 12.

Jubilee (Forbes).—Very similar to 'Telegraph' but flowers opening rosy-

crimson passing to rosy-magenta. Flowering from May 12.

GUARDSMAN (Bath).—Plant vigorous, of compact habit; flower stems erect, 2½ feet long; flowers 2½ inches diameter, at first rosy-crimson, later rosy-magenta. Flowering from May 26.

Flowers Rosy-Magenta, Double.

GEM (Forbes) .- Of spreading habit; flower stems drooping, very leafy, 28 inches long; flowers 21 inches diameter, rosy-magenta. Flowering from May 25.

Carminatum (Sent by Messrs. W. H. Simpson), H.C. June 1, 1933. -Vigorous and of compact habit; flower stems stout, erect, 23 feet long; flowers 21 inches diameter, dull rosy-magenta. Flowering freely from May 23.

Flowers of Scarlet Shades, Single.

Conspicua (Forbes).—Plant spreading; flower stems drooping, 28 inches long; flowers 3 to 31 inches diameter, rosy-scarlet. Flowering from May 23.

Lady Alfred Harmsworth (Sent by Messrs. W. H. Simpson), H.C. June I, 1933.—Plant very vigorous, somewhat spreading; flower stems stout, 32 inches long; flowers 31 inches diameter, bright rosyscarlet. Flowering freely from May 12.

CLEMENCE (Barr).—Of compact habit; flower stems wiry, 2 feet long; flowers 2 inches diameter, deep rich scarlet. Flowering from May 12.

Flowers of Rosy-Crimson Shades, Single.

Joy Ring (Kelway).—Vigorous and of compact habit; flower stems $2\frac{1}{2}$ feet long; flowers $3\frac{1}{2}$ inches diameter, bright rosy-crimson. Flowering freely from May 20.

Mrs. Mallet (Raised by Mr. H. Robinson and sent by Messrs. Bath), H.C. June 1, 1933.—Plant vigorous, of erect habit; flower stems erect, stout, 2½ feet long; flowers 3 inches diameter, rosy-crimson. Flowering freely from May 20.

STOUT FELLA (Kelway).-Vigorous and of somewhat spreading habit; flower stems stout, 32 inches long; flowers 3 inches diameter, rosy-crimson. Flowering from May 20.

Flowers of Rosy-Crimson Shades, Double.

Captain Nares (Bath).—Of compact, erect habit; flower stems stout, 2 feet long; flowers 2½ inches diameter, dull pale rosy-crimson. Flowering sparsely from May 26.

MADEMOISELLE PATTI (Forbes).—Of compact habit; flower stems weak, drooping, 22 inches long; flowers 2½ inches diameter, dull rosy-crimson, disc florets pale magenta. Flowering from May 20.

HOMERUS (Forbes).—Vigorous and of compact habit; flower stems erect, 2½ feet long; flowers 2½ inches diameter, bright rosy-crimson. Flowering from May 20.

J. N. Twerdy (Sent by Messrs. Forbes, W. H. Simpson, Barr, Bath), A.M. June 1, 1933.—Plant vigorous, of spreading habit; flower stems stout, erect, 32 inches long; flowers 31 inches diameter, bright rosy-crimson. Flowering freely from May 20.

Beauty of Laeken (Forbes, Barr).—Of compact habit; flower stems erect, wiry, 11 foot long; flowers 21 inches diameter, rosy-crimson, disc florets pale rose; ray florets narrow. Flowering sparsely from May 26.

Louis Delasalle (Sent by Messrs. Barr, Forbes), H.C. June 1, 1933.— Plant vigorous, of somewhat spreading habit; flower stems, stout, erect, 28 inches long; flowers 2\frac{3}{2} inches diameter, bright rich rosecrimson. Flowering from May 20.

Flowers Rosy-Crimson, Anemone-Centred.

Margaret Deed (Raised and sent by Mr. H. Robinson), H.C. June 1, 1933.—Very vigorous and of spreading habit; flower stems stout, erect, 32 inches long; flowers 31 inches diameter, rosy-crimson, disc florets pale rose. Flowering freely from May 20.

Flowers of Crimson Shades, Single.

CRUSADER (Bath).—Vigorous, of compact habit; flower stems erect, wiry, 26 inches long; flowers $2\frac{1}{2}$ inches diameter, crimson. Flowering from May 26.

JAMES KELWAY (Kelway, Barr, Bath).—Plant vigorous, of very spreading habit; flower stems stout, drooping, 2 feet long; flowers 21 inches diameter, crimson. Flowering from May 20.

GLORIOUS (Kelway).—Very vigorous and of spreading habit; flower stems stout, 32 inches long; flowers 3½ inches diameter, crimson. Flowering from

GENERAL GASELLE (Forbes).—Of spreading habit; flower stems stout, drooping; flowers 21 inches diameter, dull crimson. Flowering from May 12.

Harold Robinson (Raised and sent by Mr. H. Robinson, introduced and sent by Messrs. Bath, and by Messrs. W. H. Simpson, and Bakers), A.M. June 1, 1933.—Vigorous and of compact habit; flower stems, stout, erect, 32 inches long; flowers 31 inches diameter, bright crimson. Flowering freely from May 20.

Scarlet Glow (Raised, sent and introduced as last), A.M. June I, 1933.—Vigorous and of somewhat spreading habit; flower stems stout, erect, 3 feet long; flowers 3 to 31 inches diameter, bright crimson. Flowering freely from May 20.

James William Kelway (Raised and sent by Messrs. J. Kelway), H.C. June 1, 1933.—Of erect, compact habit; flower stems stout, 28 inches long; flowers 2\frac{3}{2} inches diameter, bright rich crimson. Flowering freely from May 20.

GENERAL FRENCH (Forbes, Bath) .- Of spreading habit; flower stems weak, drooping, 26 inches long; flowers 21 inches diameter, deep crimson. Flowering from May 23.

Flowers Crimson, Double.

Lord Rosebery (Sent by Messrs. W. H. Simpson, Barr, and Bath). A.M. June 1, 1933.—Plant vigorous, of erect, compact habit; flower stems erect, stout, 28 inches long; flowers 3 inches diameter, bright crimson. Flowering freely from May 20.

SWEET PEAS AT WISLEY, 1933.

As explained last year (JOURNAL R.H.S., 58, 217), the trials of Sweet Peas at Wisley are carried out by the Royal Horticultural Society and the National Sweet Pea Society jointly, and the judging is in the hands of a Joint Committee under the chairmanship of Mr. G. W. LEAK.

In October 1932, one hundred and thirty-three new varieties were received for trial, and in addition ninety varieties were grown for comparison, the seed of all being sown in pots on October 14. The plants were set out in rows on March 29, 1933, twelve plants of each variety being grown naturally and twelve (six only of the older varieties) of each as cordons. The plants were not permitted to flower until June. Varieties liable to burn in bright sun were protected by scrim shading.

The Judging Committee met on July 5 and 6,1933, and made recommendations for Awards to nine new varieties, descriptions of which follow.

AWARDS TO NEW VARIETIES.

Flowers cream.

Grand National, A.M. July 5, 1933. Raised and sent by Messrs. E. W. King, Coggeshall, Essex. Flowers pale cream, large, in fours on 9- to 15-inch stalks.

Flowers pink on white.

Springtime, A.M. July 5, 1933. Raised and sent by Messrs. Dobbie, Edinburgh. Bright pale rose-pink on white; flowers large, in fours on 9- to 18-inch stalks. This variety received the Gold Medal of the National Sweet Pea Society for 1933.

Flowers pink on cream.

Prince, A.M. July 5, 1933. Raised and sent by Messrs. Sutton, Reading. Bright pale pink on cream. Flowers large, in fours on 9- to 18-inch stalks.

Cissie, A.M. July 5, 1933. Raised and sent by Messrs. R. Bolton, Birdbrook, Halstead, Essex. Pale pink on cream. Flowers large, in fours on 9- to 18-inch stalks.

Princess, H.C. July 5, 1933. Raised and sent by Messrs. Sutton. Bright rich deep pink on cream. Flowers large, in fours on 9- to 18-inch stalks.

Flowers cerise.

Jumbo, A.M. July 5, 1933. Raised and sent by Messrs. R. Bolton. Bright cerise. Flowers large, in fours on 9- to 18-inch stalks.

Flowers orange-cerise.

Nippy, A.M. July 5, 1933. Raised and sent by Messrs. E. W. King. Bright orange-cerise, wings pale cerise. Flowers large, in fours on 9- to 16-inch stalks.

Flowers salmon-orange.

Setting Sun, H.C. July 5, 1933. Raised and sent by Messrs. Carter's Tested Seeds, Raynes Park, S.W. Bright salmon-orange. Flowers large, in fours on 9- to 18-inch stalks; requires shading.

Flowers crimson.

Rubicund, A.M. July 5, 1933. Raised and sent by Messrs. Cullen, Witham, Essex. Bright rich crimson. Flowers large, in fours on 9- to 18-inch stalks.

The Joint Committee also selected the following from among established varieties to recommend for general garden cultivation.

VARIETIES RECOMMENDED FOR GENERAL GARDEN DECORATION.

Admiral, violet-blue.
Ambition, deep lavender.
Ambition, deep lavender.
Ascot, pink.
Beatall, pale blush cerise.
Beauty, pale pink.
Black Diamond, deep maroon.
Charming, cerise.
Corona, rose.
Damask Rose, carmine.
Flamingo, scarlet-cerise.
Gleneagles, light blue.
International, rosy-mauve.

Ivory Picture, ivory.
Jack Hobbs, flushed deep salmonpink, cream ground.
Magnet, salmon-cream pink.
Mayfair, deep pink.
Pink Glow, pink.
Pinkie, deep pink.
Sextet Queen, white.
Sunkist, pink-edged, on cream.
Sybil Henshaw, crimson.
Welcome, scarlet.
Youth, pink-edged, white ground.

BOOK REVIEWS.

"Trees and Shrubs Hardy in the British Isles." By W. J. Bean, I.S.O., V.M.H. Vol. III. 8vo. xiv + 517 pp. (John Murray, London, 1933.) 36s. net.

It does not overstate the case to say that this volume has for long been eagerly awaited by every grower of trees and shrubs in this country. It has been the fortune of the two former volumes, which Mr. Bean prepared in 1913, to spend more of their twenty years of very active life upon our tables than our shelves. Elwes, in his highly appreciative review of them, said that gardeners from the milder regions would have welcomed a wider scope for the book than is implied by the hardiness of a species at Kew. Their desires have now been amply fulfilled and the trilogy is complete.

Volume III performs the double function of describing the multitude of plants, for the most part from China, which have become known in cultivation since 1913 and, secondly, those genera and species which can be grown by the fortunate whose gardens are in Devon, Cornwall, South Wales, the West of Scotland, in Ireland, to a lesser degree in mid-Sussex, and on the seaboard of Hampshire and Dorset. Most of us can only envy those to whom are possible such plants as, for example, the eight Acacias, nine Pittosporums, twenty-four Olearias and ten Senecios which Mr. Bean now describes. Indeed, the cultivation of the trees and shrubs of Australia, Tasmania, the Chatham Islands and New Zealand is almost confined to those parts of the United Kingdom; we may, however, except the numerous Veronicas from the South Island of New Zealand. It is a deprivation that the climate of no part of our islands is suited to the woody plants of South Africa. The trees and shrubs of Chile have a wider field for cultivation with us than those of any other region of the Southern Hemisphere. Of the semi-tender plants included, many of the genera are represented by a single species.

The plants of the first category happily are more numerous than those of the second. It is gratifying that such a large proportion of the new introductions, of which little or nothing was known in 1913, have proved their hardihood and are now flourishing throughout our country. Among the best known genera the following additions appear in the new volume: Berberis 29, Prunus 18, Malus 9, Sorbus 17, Spiraea 10, Vaccinium 15, Viburnum 9, Cotoneaster 16, and Rhododendron 200; of the last the greater part are hardy. Of the twenty new oaks many are from Western China and less than half are suited to the climate of Kew.

Mr. Bean's introduction to the enumeration of Rhododendrons is an admirable conspectus of the astounding extension that has been seen in the last twenty years in the introduction and cultivation of members of this enthralling genus. Regarding two of the explorers who have furnished us with them I would quote our author:

"At that time (1913) the introductions of E. H. Wilson from Szechuen and Hupeh were comparatively new to gardens, and many of the finest species had not yet flowered in cultivation. . . . Wilson's work can only be regarded as a kind of prologue to the great rhododendron epic. It is mainly due to the wonderful work and amazing industry of George Forrest, also to his organisation and training of native collectors, that rhododendrons are so prominent in horticulture today. He worked chiefly in W. Yunnan, E. Tibet and N.E. Burma, in latitudes considerably to the south of Wilson's area, and his introductions on the whole are not so hardy."

There are very few of the better known cultivators of trees and shrubs whose names do not appear here and there in Mr. Bean's descriptions, as do those of the principal gardens in the United Kingdom and Continent. These references are a source of pride to the living and will be an immense addition to the interest of the book when this generation has passed on. We shall be envied by the cultivators of the future. The last thirty years have been a time of unexampled profusion in the dissemination of new plants brought to us by a gallant band of botanical explorers. Alas, only Kingdon Ward and Rock survive of the great plant collectors in Western China, the last but by far the richest area in the world to be explored for hardy species. There is now no great region left from which to expect any considerable accession of plants that we can grow out of doors. We are fortunate to have lived through a gardening experience unique to our age which can never recur for our descendants.

Up to the year 1913 the main source of supply to the public of the newly introduced species was the great nursery of James Veitch & Sons at Coombe Wood. A tributary stream came for some of us by the generosity of Professor Sargent, who sent us plants from the Arnold Arboretum. Then, just at the time of the appearance of the first two volumes of Mr. Bean's book, there took place the most important dispersal of rare plants that had ever occurred in this country in the sales at Coombe Wood of October 1913 (4 days), February 1914 (9 days), and October 1914 (12 days). Since then the vast numbers of seeds sent home by Wilson, Forrest, Kingdon Ward and Rock have been, for the most part, sown in public and private gardens, and only to a lesser degree by nurserymen. The processes of propagation, hybridization and exchange will continue for years to come, though we can hope for seeds of few new species in the future.

At the end of his introduction the author records the founding in 1924 of a national arboretum at Bedgebury in Kent, which is under the joint management of Kew and the Forestry Commission. He might also have noticed the establishment of the national Scottish arboretum of Benmore in the Cowal district of Argyllshire. It was made available by the munificence of its former owner, Mr. H. G.

Younger, who presented it to the nation in February 1925. The Edinburgh Botanic Garden shares with the Forestry Commission the care and extension of what was already one of the finest collections of trees and shrubs in Great Britain. In a beautiful glen at Benmore a memorial, in the form of a rest-house, has been set up to Sir Isaac Bayley Balfour, who died on November 30, 1922.

The volume before us conforms to its predecessors. The descriptions of each species, usually from fourteen to twenty-five lines, are models of terse and concentrated information fluently written and telling everything of interest that the ordinary person wants to know of the plant in question. Varieties and closely allied species are described under each, the latter in smaller print. The best known synonym is cited, and in every case where a plant has been figured in the Botanical Magazine its number in that work is given. The proof-reading must have been done with extraordinary care, as after a close perusal of the 517 pages of the book, your reviewer has only detected three insignificant misprints. There are 64 plates, two-thirds of which are of flowering or fruiting sprays well photographed against a dark ground, and the remainder are of the whole tree or shrub. The former take the place of the drawings which the previous volumes contained.

Mr. Bean gives descriptions of 12 Firs which did not appear in Volume I. These bring the total number up to 37—in fact, every known species. He recognizes Abies Faberi, A. Faxoniana and A. Forrestii as good species, and would have us alter our 'A. Delavayi,' as now seen in many collections, to A. Faberi of Craib. He follows Dallimore and Jackson in their view that there are probably only four Spruces in China, though he and your reviewer are at one in thinking that some of the many spruces embraced by those authors in Picea asperata and P. likiangensis may yet be found sufficiently distinct to merit specific rank. American writers are still loth to drop the numerous species described in Plantae Wilsonianae, which were nearly all found by Wilson in the autumn of 1910.

It is gratifying to your reviewer to find that Mr. Bean rejects with some impatience unfamiliar nomenclature for well-known conifers which botanical pedants would wish us to adopt. He retains Pseudotsuga Douglasii, Abies Webbiana, Larix europaea and L. leptolepis. It does not seem likely that names so absurd as Picea Abies and Larix decidua or so confusing as Abies alba and Larix Kaempferi will attain general acceptance in this country.

As in Volume II, and following the Kew practice, the composite genus of Pyrus is taken to contain the Crabs and Services as well as the Pears. The more natural and certainly the less unwieldy treatment as adopted in America and elsewhere of retaining Sorbus, Malus, Pyrus and Aronia as distinct genera would seem preferable. Mr. Bean, however, refers to this in his introduction to the genus and helps his readers by indicating the group to which each species belongs by supplying synonyms given by those who have so divided the genus.

It is a confusion to many to find the names Pyrus Sargentiana and Pyrus (Malus) Sargentii for two entirely different plants. The good Norse word Rowan might have been substituted for 'Mountain-Ash,' and that misleading name given a decent burial. There is still at least one nurseryman's catalogue where 'Mountain-ash' appears next to Fraxinus excelsior!

One interesting detail which is given of almost every plant is the date of its introduction and usually the name of its introducer. In the case of *Nothofagus procera*, a tree which promises well wherever it has been planted in this country, Mr. Bean gives the date of its introduction at Kew through the Dendrological Society of France as 1913. It was, however, in October 1912 that a considerable supply of seed first reached England from Chile and from it fifty plants were raised and distributed.

Two plants are named after the author, Berberis Beaniana and the rare Meliosma Beaniana, both good hardy species which are doing their distinguished god-parent credit in this country.

There is no one to whom lovers of trees and shrubs are more heavily indebted than to Mr. Bean. It is good to know that, despite the hideous appearance of the new arterial roads which deface our country-side in these days, their margins are being redeemed to some degree by the wisdom and experience that Mr. Bean brings to the Committee of the Roads Beautifying Association.

"Informal Gardens." By H. Stuart Ortloff. 8vo. 115 pp. (Macmillan, New York, 1933.) 7s. 6d. net.

Our countrymen are said to take their pleasures sadly. If this book is of a type popular in the United States, it may be inferred that our transatlantic cousins take at least one pastime seriously. The little treatise indeed is quite severe reading; such phrases as "balance, accent, and enframement" make one pause to think, and scientific treatment of the subject is (happily) not relieved

by any sentimental chatter.

The informal garden being now the rule rather than the exception in this country, the author's strictures on formalism are perhaps little needed by English readers, though even some of the converted may find a salutary reminder in the warning that "informal "does not mean" formless, "since, in fact, "the informal or naturalistic garden is very much thought-out and planned." The main point, urged and developed with a number of diagrammatic illustrations, is that, whereas the formal style aims at "symmetrical balance," a naturalistic scheme will aim at "occult balance": art will supplement nature, but it will be the art which conceals art. To this author design is everything; the individual plant is of very subordinate importance. Though he admits that "accent, material and specimens are at times necessary to the naturalistic scheme," he lays down that "most informal design will be built up around an open central area which will be kept free of specimen plants and other encumbrances." We are then to a certain extent allowed to grow a plant for its individual interest and beauty, but it must have its place in the scheme. Which being so, it is not surprising to find that that view of a garden which regards it primarily as a "collection of plants" receives no countenance, and that the growing of imported plants is discouraged: the ideal is a garden which shall be roo per cent. American, and nearly all the plants mentioned are native to the North American continent—which after all does allow a wide range of choice. The "foundation," so to speak, is to consist of plants growing wild in the district to which the garden belongs, it being held that such plants are most in character with the place and most likely to thrive: foreign plants must only be introduced "if they are wholly congruous with the native species." This is a hard saying, and perhaps less convincing than it sounds at first hearing. Is there really much "incongruity"

in the modern English garden stocked with material derived from all parts of the temperate world, in which denizens of Chinese and New Zealand Alps, of the Rockies and the Andes, and other exotic paradises, jostle one another? To acclimatize such aliens is a large part of the joy and fun of gardening. In that craft there may be said to be two competing ideals, represented respectively by the gardener who cares most for the scheme and the gardener whose prime concern is the several plants for which he tries to find a congenial home. Pursued to excess the former ideal may result in a pleasannce whose interest is exhausted in a very short visit, while the latter may degenerate into a museum, not to say a jumble. But surely it is possible to compromise? That is successfully done in many English gardens, great and small, which could be mentioned. Mr. Ortloff takes, deliberately no doubt, a one-sided view, which he develops with sound sense and good taste; one may well take pains to follow his advice, without being too strictly bound by the limitations which he imposes.

without being too strictly bound by the limitations which he imposes.

In a chapter on the Selection of Plants it is suggested that some will prefer to do their own collecting. A suitable protest is made against doing this in a heedless manner: thus one is told never to take all the plants of a "variety" (this much misused word presumably means here "kind") found in any one place, but to leave "three or more"! The collector is advised to study the habitats and soil of the plants which he wants, and to that end to take with him on his hunting expeditions a note-book and a small soil-testing kit. The word ecology frequently recurs, and the importance of ecological considerations is emphasized. A useful brief discourse on rock-gardens contains the epigrammatic complaint that in constructing these fashionable excrescences, too often "instead of ecology we stress geology." Due protest is made also against the modern craze for dumping down a rock-garden just anywhere, and for covering it with quite unsuitable plants: "the only excuse for a rock-garden is to provide a suitable place to grow rock and alpine plants." Further chapters deal, among other matters, with bog and water gardens, treatment of difficult sites, bird gardens, structural elements in the informal garden, viz. walls, steps, gardenhouses, etc.

Nearly twenty pages at the end of the volume are filled with lists of native plants suitable for various soils and positions. These lists (in which there is naturally a good deal of repetition) will interest others besides Americans. It is rather a shock to see Circaea lutetiana (Enchanter's Nightshade) recommended even for the most naturalistic garden: the same list includes Geranium Robertianum. An insularly ignorant reviewer is entertained with some of the American names: thus Amelanchier canadensis (? laevis) is 'Shadblow,' Ivis prismatica is 'Cubeseed Iris,' and various Viburnums are Hobble-bush, Nanny-berry, Black-haw, Cranberry-bush. A good many rather glaring misprints disfigure this part of a book which otherwise is produced in a manner worthy of its publishers.

"A Lawyer's Forest: His Lagan and Letters." By C. Barnby-Smith. 8vo. vii + 160 pp. (Besant, London, 1933.) 2s. 6d.

Those who enjoyed a "Lawyer's Garden" will want to read of his "Forest" (for the forest is a plantation of "dwarf" trees, mainly Conifers), and its subsequent behaviour, and of his underplantings for colour in the forest garden. This little essay takes the first ten pages of the book. The remainder is occupied by musings on many matters. It is a book to pick up and read at odd times, for it will beget thought.

"I Know a Garden." By Marion Cran. 8vo. 316 pp. (Jenkins, London, 1933). 10s. 6d. net.

Mrs. Cran knows a great many gardens and writes about them very charmingly. The present book is a series of essays on various gardens, typical of the people who made them perhaps; with sketches of the owners who welcomed Mrs. Cran and showed her their treasures. It is a most readable book, full of pleasant stories with much excellent advice about cultivation, planting, and caring for a garden.

There is a delightful chapter about birds, part of which we might well take to heart when we are told of an annual sale at the Crystal Palace, where not only cage-bred canaries are sold, but scores of small wild birds. And worse still, of a market in London where larks, finches, buntings, linnets, etc., are sold in great numbers every Sunday morning.

There is a chapter on Cats; and a sad story of a pet, caught in a steel trap who was not found for nine days, and was brought home almost dead from pain and starvation, and Mrs. Cran nursed him back to life minus one leg.

She writes with love of the country, animals, and friends; and a wide knowledge from her many travels. She seems to like best the deep clay of the Kentish Weald and speaks with some contempt of the easy Surrey sand, which, personally, the reviewer is getting rather fond of.

The book may be read from cover to cover, and in it there is much to learn and to enjoy. It is light to hold, the pictures are pretty, and we feel sure it will

find its way to many friends as a pleasant present.

"A Short History of Gardens." By H. N. Wethered. 8vo. 323 pp. (Methuen, London, 1933.) 12s. 6d.

This is an ambitious attempt to cover, in a comparatively small volume, the

development of gardens from earliest times up to the present day.

Commencing with the early mythical Paradises, it demonstrates how the gardens of successive civilizations reflected the religious, social and scientific

spirit of the period.

Perhaps the most interesting chapters are those dealing with the many changes of thought and fashion which have influenced the design of gardens in England during the course of the last three centuries. Although a great deal has already been written on this subject, the author succeeds in treating it in an original manner and in preserving an unbiased attitude towards the various systems which sprang up.

The book is well illustrated and contains twenty reproductions taken from

contemporary pictures and prints.

"Die tierischen Samenschädlinge in Freiland und Lager" (The Animal Pests of Seeds in the Field and in Storage). By F. Zacher. 8vo. viii + 78 pp.; 20 plates. (J. Neumann, Neudamm, 1932.) 4 RM.

This work forms the fifth number of the excellent series "Horticultural Science and Technique," published under the editorship of Prof. Dr. Höstermann, of Berlin.

The author is a recognized authority on the pests of stored products, and in this work he summarizes the knowledge of the more important pests of seeds, both in the field and under conditions of storage.

The Arthropodous pests, exclusive of the Class "Hexapoda" (insects), mentioned (pp. 1, 2) are the coconut crab, Birgus latro L., which attacks the fruit of the Coco- and Sago-palms; and the mites Tarsonemus spirifex March and Aleurobius farinae L., generally known as the flour mite.

The remaining pages are devoted to a review of the insect pests of seeds: Coleoptera (pp. 3-66) and Hymenoptera (pp. 66-78); and of species which are of economic importance, brief descriptions are given, together with notes on their distribution, bionomics, and control.

The seventy figures, which appear on Plates 1-20, are particularly good, for excellent photographic reproductions are given of the more common species of

seed insects and of damaged seeds.

The author may have considered that an index was unnecessary in so small a volume, but it is hoped that this defect will be remedied in the second part of the work.

We shall hope that an English edition of this work will appear at no far distant date.

"Fighting the Insects: The Story of an Entomologist." By L. O. Howard. 8vo. xvii + 333 pp. (Macmillan, New York, 1933.) 12s. 6d. net.

The author, who has been called the "Grand Old Man of Entomology," has set forth his life story which, as he states in the introductory chapter, may be found to be interesting.

This autobiographical review of the life of a great leader in his particular science is one that will appeal, not only to entomologists but to general readers.

Dr. Howard in summing up the personalities of two of his friends remarks of the one that "he is a very distinguished man and a charming gentleman," and of the other that "he is a man of broad culture"—these two epitaphs are applicable to the author. He did not realize in writing the eulogy of Dr. Graham Bell (p. 287) that he was in fact expressing the position that he himself holds in the minds of his fellow entomologists.

This book is concerned chiefly with the "History of Applied Entomology," this being the title of an earlier book published in 1930 by the Smithsonian

Institute of Washington.

The reader will marvel at the versatility of the author, whose every waking moment must have been fully occupied with his multifarious duties. Dr. Howard, besides occupying the post of Chief of the Bureau of Entomology at Washington and, later, that of Principal Entomologist to the United States, was the Secretary of the Cosmos Club for many years, and Permanent Secretary of the American Association for the Advancement of Science. The author was a great traveller, for he extended the operations of the Bureau of Entomology to cover Europe and other continents, as most of the more important pests of agricultural crops in the United States proved to be of foreign origin. It was necessary for him, therefore, to organize the work of obtaining parasites of such pests in their country of origin.

In spite of his many distractions, he found time to publish highly scientific papers dealing with many groups of insects, more especially the Parasitic Hymen-

optera-a group to which he was particularly attached.

Dr. Howard was mainly responsible for stimulating the interest taken in the biological control of insect pests; and the early history of some of the more spectacular introductions of parasites, for instance, the control of the fluted scale on Citrus by the Australian ladybird in Southern California, makes most interesting reading.

The author is a skilled *raconteur*, and this amusing and kindly man has many a story to tell, not only of his fellow entomologists but of many men notable in other spheres of life. He was a popular figure wherever he went, and was the outstanding personality at the Fourth International Congress of Entomology held at Cornell University, Ithaca, N.Y., in 1928.

There is a serious omission in this otherwise notable biography, that is the absence of a photograph of the author—an omission that one trusts will be

rectified in a second edition.

This book is heartily recommended to all who wish to read the story of a great entomologist.

The period of Dr. Howard's career has passed, and no one man will ever again be in the position to write so full and so interesting an account of the great progress that Entomological Science has made during the past fifty years.

progress that Entomological Science has made during the past fifty years.

A fitting conclusion is to repeat the author's closing words: "I am thankful that fate has given me a chance to see this great progress, and to watch it from the inside, and to be one of the workers." This statement will be endorsed by present and future generations, whose health and general culture will depend on the work of such men in their fight against injurious insects.

"Insects and Diseases of Ornamental Trees and Shrubs." By E. P. Felt and W. Howard Rankin. 8vo. xix + 507 pp.; 243 figs. (Macmillan, New York, 1932.) 25s. net.

An earlier volume of the Rural Science Series appeared in 1924 under the title "Manual of Tree and Shrub Insects" (JOURNAL R.H.S. 51, p. 168) for which the senior author was responsible. This volume is a combination of the senior author's manual and the junior author's "Manual of Tree Diseases"—the subject matter being entirely rewritten. It summarizes available information on the problems relating to insect pests and fungus diseases of shade and ornamental trees and shrubs.

The book is divided into two parts, viz.: Part I, which deals with Insects (Chapter I) and Fungi (Chapter II) and their depredations; Insecticides and Fungicides; and Injuries other than those caused by organisms. Part II, in which appears a list of trees and shrubs, arranged alphabetically, with accounts

of the insects and fungi associated with each.

Insect pests, numbering some 500 species, of which 52 are of foreign introduction, are recognized as having a more or less definite economic importance, so far as trees and shrubs in the United States of America are concerned. While the total number of species of fungi that cause diseases on these plants is large, the important species of fungi are not so numerous as the insect pests.

The format of the book is good, and the numerous illustrations are excellent, and will enable the general reader to determine the major pests and diseases of

trees and shrubs with comparative ease.

While this book is intended primarily as a guide for the American gardener and forester, there is a great amount of information in it that should interest the intelligent British gardener and forester irrespective of two facts, viz.: (i) that a great many species of insects and fungi mentioned do not occur in these islands, and (ii) that our own forest and ornamental trees and shrubs do not, fortunately, support such an extensive fauna and flora.

"The Way of a Bee." By George Rendl. Translated by P. Kirwan. vi. + 168 pp.; 1 plate. (Longmans, Green, London, 1933.) Price 6s. net.

This book, which has been ably translated from the German, treats of bee-life in every aspect—the author being a man whose knowledge of the subject is profound. The son of an Austrian bee-keeper, he has studied the ways of bees from his earliest childhood. He says: "Though at first there was much that was puzzling, yet in the course of years I was their grateful watcher and curious observer, secret after secret was unveiled."

The style in which this book is written is that of Maeterlinck, that is with the poet's skill, but devoid of that licence which is said to be the prerogative of the

A delightful word-picture is painted of the life of the hive throughout the year—from winter to winter—all the joys and sorrows to which the individual and the swarm are heir are described in a profoundly knowledgeable manner.

The lay reader may be excused somewhat the doubts that will crowd upon him as he reads the story of a hive of bees, but the intelligent apiarist will endorse most of the statements, and will be filled with delight at the beauty of the prose and the wonders of Nature herewith revealed.

"The Scotland of our Fathers: A Study of Scottish Life in the Nineteenth Century." By Miss E. S. Haldane. 8vo. xii + 376 pp. (Maclehose, London, 1933.) 12s. 6d. net.

A most readable and interesting book on all matters dealing with Scottish life in the period indicated, and with particular claim to notice in these pages because of the section (pp. 320-333, part of the chapter on "How the Rural Workers Lived") on "The Scottish Gardener." It gives an account of the type of gardens met with in Scotland in the early part of the nineteenth century and of some of the subsequent developments.

"Recent Advances in Plant Physiology." By E. C. Barton-Wright. Ed. 2. 8vo. x + 341 pp. (Churchill, London, 1933.) 12s. 6d.

The first edition of this book was published in 1930 and was then noticed in our columns. The book has been brought up to date by references to and notes upon work done between 1929 and 1931, and it has been to a considerable extent rearranged. It forms a very useful indication of the sources of information open to the student and researcher, and is an index to the present trend of research in plant physiology.

A little more care in checking index references and in the correction of the proofs would have increased the value of the book, and so, too-even though it had increased its size—would the inclusion of accounts of some work which seems to have been overlooked. Investigations upon the effect of light of different kinds and of varying temperatures upon growth have given results of importance

which are not even mentioned.

"Unsere Freiland-Standen." By Ernst Graf Silva Tarouca and Camillo Schneider. Ed. 5. Large square 8vo. 483 pp. (Holder-Pichler-Tempsky, Vienna, 1934.)

The fourth edition of this extremely useful book was published in 1927, and that the fifth has followed so soon is good evidence of its value. This is not a new edition in name only, but is considerably larger than its predecessor and contains matter bringing it well up to date.

After a preface giving something of the history of the book and some chapters on the use of hardy herbaceous plants in the garden, including the rock garden and the wild garden, occupying the first 35 pages, the principal part of the book is reached, which is an alphabetically arranged list of genera of herbaceous plants with descriptions of species and of the best varieties. Ferns are included and hardy bulbous plants.

This list occupies 375 pages and is very complete. We have nothing quite so good on this section of garden plants in English. The descriptions are terse but sufficient, the directions for cultivation excellent, the illustrations, of which there are 449, from photographs of growing plants, well selected and well reproduced. The print is clear and the book not too heavy to hold. Space is saved by abbreviations, but these are explained on a ribbon-held bookmark in an ingenious way, so that they are readily referred to.

In interpreting the term hardy, plants are taken which will survive the climate of middle Europe outdoors, and references are given to the "common" names of plants, though the general arrangement is under the botanical names. Care has been taken to bring these names into line with the names of genera accepted at the Paris Horticultural Congress of 1932, and advantage has been taken nearly all through of the resolution to recognize the use of small letters only for initials of specific names, thus simplifying the writing of labels and so on.

Finally, several addenda give lists of plants arranged in special ways—as for colour, monocarpic plants, bee plants, plants of botanical interest, generic names

given in honour of persons, and so on.

It is a book which we can thoroughly recommend, and even for those who do not read German the lists of names and many of the notes, which could be easily interpreted, will prove extremely useful.

"Roses et Rosiers." By MM. Revoire and Ebel. 8vo. 386 pp. and 98 photographs and figures in the text. (The Authors, Paris, 1933.) 24 fr. Paper covers.

The constant influx of new varieties of Roses, some few of which gradually supersede the older varieties, presents an annual problem to the nurseryman, often of considerable difficulty, when he has to decide on the varieties he will bud for sale to his customers and when he prepares his autumn catalogue. When can a Rose that has done good service in its day be considered obsolete? and what Roses can he safely excise from his list of the previous year?

Most nurserymen will admit that their lists are too long, and contain many varieties for which they can expect but a small sale, while the great number of names tends rather to confuse than assist the amateur when he endeavours to

make a selection of the varieties that are likely to suit him.

It is believed that the difficulty is generally recognized and that some endeavour is being made by members of the trade to reach some agreement on the subject that may be mutually helpful.

Something towards simplification is attempted by the National Rose Society by the somewhat drastic deletions which they make in the new editions of their

select list of Roses published about every three years.

So far as one can judge from the catalogues received it would appear that any general agreement is still somewhat far off. The lists of the principal growers may contain from 400 to nearly 1,000 varieties, for many of which there can be but small demand. Reduction, however, cannot be effected indiscriminately, and it does not follow because an older Rose may have been superseded by an improved variety that it can for some years safely be deleted.

Every amateur who desires to maintain a well-kept Rose garden requires to review his beds every autumn, and take out all those plants which have not made satisfactory growth or are decreasing in vigour, replacing them with young plants; in many a garden Roses of an older type, which might generally be considered obsolete, are still grown with satisfaction to their owners, and thus there may be a limited demand for a Rose for some years after it has been superseded, and this demand has to be met while it lasts.

These remarks are suggested by the volume before us, which is an interesting

little book on French Rose growing.

After some forty pages devoted to the Legends and History of the Rose the authors proceed to consider its botanical characteristics. They divide the Rose into sixteen sections, some of which are subdivided. They then divide the whole into dwarf and climbing varieties, and deal separately with each division, adding at the end of each division a selected list of the best garden varieties of that division.

This has meant the resurrection of a large number of Roses now obsolete for garden purposes; thus the list of over seventy Hybrid Perpetuals contains only three or four varieties now generally grown; and somewhat similar criticism may be applied to the lists appended to several of the other sections though they may possess considerable value in dealing with the history of the Rose.

The list of Hybrid Teas, which is naturally the longest, contains about a

hundred varieties, and is brought down to the new Roses of 1929.

The cultivation and propagation of Roses are carefully dealt with, and, perhaps, from the amount of space devoted to various forms of grafting, one may surmise that grafted as opposed to budded plants are thought more of in France than in this country.

There are chapters on the commercial cultivation of the Rose and an interesting account of the efforts made by the French nurseryman to recapture something

of the cut-flower trade which was, it appears, largely supplied by the Dutch

growers after the war.

Lists of Roses considered suitable for the forcing and the cut-flower trade are given, over forty varieties being included as well as about eight of the Hybrid Perpetuals. In this country the large growers of Roses for the cut-flower trade, some of whom may have 8 or more acres of glass devoted to the purpose, usually confine themselves to under half a dozen varieties, and it is doubtful if any Hybrid Perpetuals are now grown for the purpose in this country.

The book contains no index. This is always an inconvenience, but is specially so in this case because of the division of the named varieties and their description into numerous separate lists, so that an inexperienced reader might have difficulty in running down the name of any particular variety he desired to find.

should be remedied in a subsequent edition.

"Climbing Roses." By G. A. Stevens. 8vo. 220 pp. (Macmillan, New Price 10s. York, 1933.)

Since the early forties of last century, when Martin, Bennett and Rivers, working on hybrids of Rosa arvensis, were producing the Ayrshire Roses (' Dundee Rambler,' was probably earlier), climbing Roses have been a feature of the

amateur rosarian's garden.

They seem almost indifferent to soil and situation, they will cover his house or his unsightly hovel, they will give brightness and ornament to rock or pergola, and may be trained into a neat and flowery hedge to hide the garden rubbish heap. It was with climbing roses that Reynolds Hole, in his immortal book, began his chapter on "Selection," and now we have a book entirely devoted to climbing roses.

The climbing roses of our modern gardens may be considered as dating, in this country, from 1893, when the Gold Medal was awarded to Mr. Charles Turner

at the Temple Show, for 'Crimson Rambler.'

The introduction of 'Crimson Rambler' was shortly followed by Barbier's Wichuraiana hybrids, a race that was fully appreciated and developed by Walsh and others in America, and these have added a brilliance of colour and decorative effect which was scarcely known in the older climbers.

Hybridization and improvement in the Wichuraiana section still continues, the tendency of recent years being to aim at and select plants with larger flowers than those found in the bunches of 'Dorothy Perkins' or 'Hiawatha.' Successful instances of this process are found in 'Emily Gray,' 'Dr. van Fleet,' 'Mary Wallace,' and Chaplin's 'Pink Climber.' The larger bloom means a smaller truss, which may be reduced to a single flower, and if this is carried too far loss of decorative effect is probable.

The attempt to obtain a perpetual-flowering climber has perhaps been less successful, though efforts in this direction continue. Mr. Lambert's bush forms, which had some second flowering, never became very popular, and it is interesting to note that our author does not seem greatly impressed with 'New Dawn,'

which was intended to be a perpetual form of 'Dr. van Fleet.'

Many other forms of climbing and bush roses are discussed by our author. These forms are numerous, but of all of them he has something of interest to tell us. Writing as he does, mainly for American readers, he is perhaps more concerned with matters relating to hardiness and winter protection than we require to be in this country. The difference in climate between Maine and the Southern States must necessarily be great, and he has to cater for all classes of Americans. It is interesting to notice that he considers yellow colouring in roses as usually indicating tenderness. Methods of pruning, training and treating climbing roses are discussed at length, and the book concludes with sixty-seven pages devoted to an elaborate list of climbing and bush roses, with brief descriptions of the varieties.

"The Wright Encyclopaedia of Gardening." By W. P. Wright. 8vo. xvii + 614 pp. (Dent, London, 1933.) 15s. net.

This is a new and enlarged edition of " Everyman's Encyclopaedia of Plants," which appeared in its last edition in 1930. Not only is the number of pages increased considerably but the size of the page also, and the text has undergone considerable change. We have tested the latter in several places and find the changes are such as to bring the book well up to date. The illustrations, which, in the former edition, were placed at the end of the text, have been added to, and are now printed with the matter to which they refer.

The arrangement of the articles is alphabetical, so that information can easily be reached provided the name of the plant sought is known, and the numerous cross-references are an aid to the use of the book. Soils and situations, seasons and propagation are all dealt with clearly and succinctly. The advice given is sound and not too much is promised where there is any doubt as to a plant.

The print is clear and good; the proof-reading has been done with care; the meanings of words are given in a carefully compiled glossary; the price is low compared with many books; though large, the book is not very heavy in the hand; the pronunciation of plant names is clearly indicated; and we have nothing to complain of except the "rustic" summerhouses, etc., depicted here and there in the book. Most of us who have used it learn to avoid wood with the bark upon it for garden ornament.

It is a book, therefore, we can recommend as useful to all except specialists, and they, when they want information outside their particular group, will be

likely to find help here.

"Recent Advances in the Study of Plant Viruses." By K. M. Smith, D.Sc. 8vo. xii + 423 pp. (Churchill, London, 1933.) 15s.

The recognition of "Virus" diseases, is a recent achievement and their study is being pursued with vigour, so that it is extremely difficult to keep in touch with all that is written concerning them. Dr. Kenneth Smith's book will therefore be welcomed by many who are themselves working on the problems involved, as well as by others who suffer loss through the occurrence of the diseases.

We do not know what viruses are. We are not sure whether they are living or inanimate. No one has actually seen them. We know they will pass a filter that will exclude bacteria. We know that sap of affected plants transferred to healthy ones carries with it something that causes the healthy one to become diseased. We know that normally this transference is done by sucking insects, mainly bugs and greenflies. We know that each virus produces characteristic symptoms in the plant to which it gains entrance, provided the conditions are suitable. But there is still much that is mysterious in general, and in detail very much to be learned regarding most of the diseases that are attributed to viruses.

Nearly all that is known and much that is so far only hypothesis is brought together in this thoroughly up-to-date and well-indexed book. The method of arrangement is such that the whole of the knowledge which has been wrung from Nature regarding any one disease—e.g., leaf-roll of potatos—cannot be seen at a glance, but the index helps one to discover what is known very readily.

Lengthy bibliographies are given at the end of each chapter, and an index of

authors who have written on the subject is also a useful feature.

"Gemüsekrankheiten." By Professor Dr. Otto Appel. sm. 8vo. 24 pl. and text. (Parey, Berlin, 1933.) RM. 5.

This useful handbook deals with insect and fungus attacks upon vegetables and illustrates the symptoms in colours. The text is very brief and each plate figures two or three of the troubles to which the plant dealt with is subject. Descriptions of the symptoms of attack, the cause, and appropriate remedies are given opposite the figures.

"The Scientific Basis of Evolution." By T. H. Morgan. 8vo. 286 pp. (Faber, London, 1932.) 15s.

This is a review of the various theories of evolution in the light of present-day knowledge by one who has himself added much to that knowledge. It is a clearly written account, taking note, not only of the evidence for but of the evidence against even the most attractive and "reasonable" hypotheses. The chapter on acquired character, for instance, is worthy of very careful perusal.

"Lilies and their Culture in North America." By W. N. Craig. 8vo. 145 pp. (Florists' Publishing Co., Chicago, 1928.)

This is an excellent and well illustrated account of Lilies as they behave in N. America. On the whole Lilies which do well in this country prove most amenable in N. America and vice versa. This is a useful introductory book on the cultivation of these splendid plants.

"How Plants get their Names." By L. H. Bailey. 8vo. vi + 209 pp. (Macmillan, New York, 1933.) 12s.

Everyone who gardens is aware that plants have names of Latin form, but few gardeners know how they originate, and not all appreciate why they are necessary

and why, occasionally, names of long standing have to be replaced by others, causing great inconvenience. The present book can be recommended as a sound and readable exposition of this subject. For the author, as for many botanists, the technicalities of plant nomenclature obviously have their fascination, but fortunately he realizes that for plantsmen in general they are more likely to represent "a nightmare of names." As is well known, a scientific name of a species consists of two words. The first word represents the genus, such as Rosa; the second or specific name, such as *rugosa*, *indica*, designates the species and cannot be applied to more than one species in a given genus. This system is called the binomial system, and was introduced by Linnæus in 1753. Professor Bailey considers it "one of the best inventions of men. . . . It answered the purpose of Linnæus and his associates when the number of known plants was few; it is in daily use one hundred and eighty years later, when plants are numbered in hundreds of thousands." Under the present rules of nomenclature the earliest

available generic and specific names, starting at 1753, must be used.

The reference to the large number of plants known to-day brings in the question of their distinction and identification; plant nomenclature is based on classification. This aspect of plant-names is not sufficiently appreciated among plant-growers; Bailey well remarks that "for horticulturists and botanists alike the central problem is not nomenclature but identification." A name is of consequence only when applied to the plant to which it belongs and to no other; the first published application of a name determines its later use. "We may make endless rules and standardized lists and yet names of plants may lie in confusion because the plants are confused. . . . If the plant-lover wishes to have accurate stabilized names for his plants, he must be sure his plants are the ones to which the names apply. A person may grow a plant for years under a given name and yet he may have the wrong plant. Gardeners rely on the label under which the plant is received; yet the label may not be reliable. All this is not to suggest that plants commonly are erroneously determined, but error in this respect is common enough in horticulture to present a real problem." To identify a plant correctly is not, however, an easy task: in some groups it is almost impossible for one who is not a specialist; the average gardener and nurseryman is content to accept the name under which he receives the plant, having usually no facilities for doing otherwise, and is naturally apt to feel aggrieved when the discovery of error necessitates a change in his labelling. Professor Bailey takes a different view: "When errors are discovered and corrected as the result of identification, the horticulturist is not to complain that the names have been changed: the plant has finally been properly determined, and he should be thankful. The accumulation of knowledge is a process of eliminating errors. We hope the process will not fall into disuse.

There are some useful notes on how to send material for identification. "At the start it is to be understood that many species of plants are so much alike that ample specimens are required to expose the differences. These dissimilarities may be in foliage, flower-bearing habit, flowers, pods, seeds; often the underground parts are characteristic. The larger the piece sent to a botanist, within decent limits, the easier it is for him to make determination and the more certain will It is not fair to ask a person to spend time on fragments." be his findings.

The rest of the book is largely concerned with the rules which now regulate the names of plants, and how they affect the horticulturist. For most people this is probably its most valuable part. It is very readable, and illustrated by many examples from common plants. The last seventy pages are occupied by a list of generic names likely to be met with in horticulture, and a list of common specific names with their meanings. To the compilers of catalogues these should be useful. The pronunciations suggested—"there is no standard agreement on rules for the pronunciation of botanical binomials"—follow practice in the United States, where, as in Britain, the vowels of Latin words are usually pronounced with English sounds; continental practice, which pronounces them usually as in modern Italian, would give different results, although the stress is essentially the same. The lists given do not pretend to be final. This book deserves to be read by all who have any interest in the scientific names of plants; the expert on nomenclature will not learn much he did not know before, but he will find the book entertaining. There are many pleasing illustrations reproduced from old books.

"Fruit and Vegetable Growing for Canning." By J. W. Morton. 44 pp. (The Fenland Press, London [1933].) IS.

This small book deals in a simple but incomplete manner with some phases of the cultivation of fruit and vegetables, and lists some of the varieties which may be suitable for canning. The information and advice is not always up to date or particularly helpful.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Acacias of French West Africa [Les Acacias de l'Afrique Occidentale Française]. Anon. (Rev. Bot. Appl. No. 144-145; Actes, pp. 167-181; figs.; Sept. 1933).—Descriptions and notes on the Acacias growing in French W. Africa, where a large area in Mauritania is occupied by Acacia tortilis, and smaller areas by A. mellifera, A. laeta, A. albida, A. Senegal, A. Samoryana, A. campylacantha, A. macrostachya, A. ataxacantha, A. Seyal, A. Sieberiana, A. arabica in two varieties, A. Kirkii, A. Rehmanniana and A. pennata. Their salient characters and distribution are indicated.—F. J. C.

Aeonium Manriqueorum Bolle. By O. Stapf (Bot. Mag., t. 9328; Oct. 1933).—A tender shrubby species of Sempervivum from Gran Canaria, fully described in Praeger's Sempervivums.—F. J. C.

Allium Beesianum W. W. Smith. By O. Stapf (Bot. Mag., t. 9331; Oct. 1933).—A blue-flowered species about 8 inches high, flowering in August and September, introduced by Forrest in Yunnan and Szechwan. Hardy and easily raised from seed.—F. J. C.

Aloe amoena Pillans. By L. Bolus (S. African Gard., 28, p. 168; July 1933; figs.).—A new species found in Cape Province allied to A. microstigma, but with a branched stem, larger, more attenuate leaves, and larger flowers.—F. J. C.

Aloe Fosteri. By N. S. Pillans (S. African Gard., 23, p. 140; June 1933; fig.).—A new species from the Transvaal allied to A. Dyeri, with a short stem and a dense basal rosette of spring leaves, marked on the upper side with pale green spots. The flowers are borne on a branched inflorescence, are shorter than in A. Dyeri, over an inch long, with orange red tube, and straight pale yellow segments with pale green tips, whitish at the margins.—F. J. C.

Aloe Framesii. By L. Bolus (S. African Gard., 23, p. 140; June 1933; fig.).—A new species from Namaqualand with a short stem, and a dense rosette of spiny leaves. Flowers tubular, 1½ inch long, orange red, keeled green, in the upper part, inner paler. Three anthers exserted.—F. J. C.

Aloe mutabilis Pillans. By L. Bolus (S. African Gard., 23, pp. 167, 168; July 1933; fig.).—This new species from an unknown locality in the Transvaal flowered at Kirstenbosch. The flowers are red in bud, greenish when mature and are produced in a dense raceme. It has the growth of plants of the section Verae with the flowers of Arborescentes.—F. J. C.

Androsace, The Genus. By A. W. Darnell (Gard. Chron., May 21, 1932, to April 8, 1933).—An alphabetical arrangement of the species to form a "horticultural monograph," combining the treatment of Pax and Knuth's monograph in Das Pflanzenreich, and Dr. Handel-Mazzetti's revision of the Chinese species in the Edinburgh Royal Botanic Garden Notes, vol. xv. Reference is made to figures, and cultural notes are given for the comparatively few species in cultivation.—E. A. B.

Apple Sawfly, Dusting for the Control of: A Preliminary Experiment. By H. W. Miles (Jour. Min. Agric., xxxix. 1933, pp. 1125-1128; 5 figs.).—The Apple Sawfly, Hoplocampa testudinea Klug., is responsible for very heavy losses to the fruit-grower, and an attempt was made to improve upon existing measures for its control.

A brief résumé of the life history is given. Owing to the fact that the female sawflies are present in a plantation of mixed varieties for about a fortnight, it is suggested that there might be considerable difficulty in timing a Nicotine spray to catch the larvæ as they hatch and migrate over a similar period.

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Arrangements were made to test the value of a repellent that might either drive away the egg-laying females or render the fruit blossom unattractive to them. Naphthalene dust, containing 30 per cent. of pure Naphthalene, was applied to plots of 'Worcester Pearmain'—the first application being made when 10-20 per cent. of the blossom was open, and a further three applications at intervals of three days. The dust was used at the rate of 3 lb. for twenty trees at each application.

The results showed that the infestation was reduced from 12 and 25 per cent. on the untreated plots to 2 and 7 per cent. on the treated plots. Several applications of the dust are necessary as Naphthalene in this form is in such a fine state

of division that it volatilizes quickly.—G. F. W.

Apples, The Nature of Shedding of Immature. By A. E. Murneek (U.S.A. Expt. Stat., Missouri, Res. Bull. 201; August 1933; figs.).—The phenomena connected with the falling of immature apples are discussed. Four periods of falling are recognized at intervals of 12 to 14 days. Under self-pollination the first fall is usually very heavy, the others correspondingly lighter; cross-pollination is followed by a lighter first fall, but heavier falls later, the variety of the pollen making no difference. Embryo abortion is thought to be the chief cause of the third and fourth falls, the first and second being due to a variety of causes, among which competition probably holds a prominent place.—F. J. C.

Arctotis acaulis L. By E. P. Phillips (Flow. Pl. S. Afr. vol. xiii, t. 501; July 1933).—The plant figured is named A. acaulis in doubt, for the author considers several plants may be included under that name, and he regards this as similar to Jacquin's A. speciosa. The plant figured is almost without a stem (save for the scapes), has green pinnate-lobed leaves about 4 inches long, and many erect woolly scapes about 6 inches long with orange-rayed, purple-disked heads about 3 inches in diameter.—F. J. C.

Asparagus Cooperi Baker. By E. P. Phillips (Flow. Pl. S. Afr. vol. xiii, t. 503; July 1933).—A lax scrambler with numerous slender short "leaves" in clusters. Said to be among the most graceful of the genus, but sparse in habit judging by the figure. Distribution not stated.—F. J. C.

Berberis tsarongensis Stapf (Bot. Mag., t. 9332; Oct. 1933).—A new species collected by Forrest on the Mekong Salween Divide in West China and distributed from his seed as Berberis aff. Tischleri. It is nearly allied to B. Tischleri, is hardy, and makes a shrub about 6 to 8 feet high with boldly toothed leaves and oblong scarlet berries in fascicles of 6 to 8.—F. J. C.

Caralluma tesselata. By N. S. Pillans. (Flow. Pl. S. Afr. vol. xiii, t. 503; July 1933).—A curious plant resembling an Echidnopsis in its stem but with typical Caralluma flowers, from the Van Rhynsdorp district of S. Africa. The corrugated stems are bright green, up to 4 inches in height, and bear the small purplish flowers near the tips.—F. J. C.

Chrysanthemum Makinoi Matsummura and Nakai. By O. Stapf (Bot. Mag., t. 9330; Oct. 1933).—This figure introduces a discussion of the origin of the garden Chrysanthemum in which Dr. Stapf points out that probably several species have had a part, the present least of all. This is a native of Southern Hondo with straggling growth and white or pink-flushed flowers.—F. J. C.

Clematis ranunculoides Franch. By O. Stapf (Bot. Mag., t. 9329; Oct. 1933).—A Chinese species from northern Yunnan generally of herbaceous type with erect growth but sometimes shrubby. Flowers purple to pale rose. Introduced by Forrest and flowering in China from May to September.—F. J. C.

Conophytum colorans. By M. Lavis. (Flow. Pl. S. Afr. vol. xiii, t. 509A; July 1933).—A new species, probably from Little Namaqualand, belonging to the cone-shaped group, allied to C. Purpusii but distinct in its convex "colourful bodies," bright scarlet sepals and (fewer) petals and by having 5 instead of 6 stigmas.—F. J. C.

Conophytum Edwardsiae. By M. Lavis (Flow. Pl. S. Afr. vol. xiii, t. 509B; July 1933).—A bilobed species from Warmbaths, S. Africa, slaty-grey when in flower, bright red when at rest. Flowers soft pink, expanding by day.—F. J. C.

Conophytum ornatum. By M. Lavis (Flow. Pl. S. Afr. vol. xiii, t. 510A; July 1933).—A new species of the cone-shaped section becoming elongated in age, with yellow flowers about $\frac{3}{4}$ inch in diameter, opening in full sunshine, stigmas purple. Native of Little Namaqualand.—F. J. C.

Conophytum Vanzylii. By M. Lavis (Flow. Pl. S. Afr., vol. xiii, t. 510B; July 1933).—Related to preceding from Bushmanland. Branches scarcely above ground, bodies whitish-green, flowers yellow, smaller than C. ornatum, expanding at first in the evening, later in the day.—F. J. C.

Crossandra subacaulis. C. B. Clarke. By O. Stapf (Bot. Mag., t. 9336; Oct. 1933).—A herbaceous plant from Central Africa at altitudes of 2000 to 6000 feet, needing treatment somewhat like that of Primula sinensis. Leaves in rosette, flowers in a short spike, salmon or brick-red; spike lengthening after flowering.—F. J. C.

Cymbidium Devonianum Panton. By V. S. Summerhayes (Bot. Mag., t. 9327; Oct. 1933).—A species from the Khasia Hills and Sikkim, with long oblong-lanceolate leaves and many-flowered pendulous racemes of greenishyellow flowers with a squarish scarlet labellum. Best accommodated in a hanging basket.—F. J. C.

Cynoglossum amabile Stapf and Drummond (Bot. Mag., t. 9334; Oct. 1933).—A beautiful blue-flowered biennial from W. China (Yunnan and Szechwan). White and pink varieties are known. Collected by Forrest, from whose seed most plants in cultivation have been derived.—F. J. C.

Discaria crenata Regel. By O. Stapf (Bot. Mag., t. 9335; Oct. 1933).—A Chilean shrub with strong spines, and small but abundant foliage. Flowers in white clusters abundantly produced. Hardy. Introduced through St. Petersburg Bot. Gard., and in cultivation at Chiswick in 1842.—F. J. C.

Euphorbia, Succulent Species in West and Central Africa [Les Euphorbes crassuplascentes de l'Ouest et du Centre Africain et leurs usages]. By A. Chevalier (Rev. Bot. Appl. No. 144; pp. 529-570; figs.; Aug. 1933).—An account of the occurrence and uses of the fleshy Euphorbias of West and Central Africa with descriptions of the species and their vernacular names. Euphorbia trapacifolia (fig.), E. Paganorum (fig.), E. Beillei and E. Baga (fig.) are new species here described.—F. J. C.

Freesia elimensis. By L. Bolus (S. African Gard., 23, pp. 167, 168; July 1933; fig.).—An autumn flowering species nearly allied to F. alba but with perianth tube abruptly narrowed and with three V-shaped markings within the tube on its lower side.—F. J. C.

Fruits, Some Injurious and Beneficial Mites on Top and Soft. By A. M. Massee (Jour. Pomology, x. 1932, pp. 106-129).—This paper brings together the scanty scattered literature dealing with the fruit-tree mites, and the descriptions, life histories, symptoms of attack, varietal susceptibility and control measures are reviewed under the respective host plants.

A great number of original observations and new recommendations for

control are given.

Mention is made of certain mites which occur in Europe, North America and

elsewhere, and which may be found here at some future date.

The number of injurious and beneficial species of mite of which information is provided in this paper is: Apple, 11; Pear, 8; Plum and Damson, 8; Cherry, 2; Peach, Nectarine and Apricot, 2; Walnut, 5; Nut, 5; Quince, 1; Red, White and Black Currants, 5; Gooseberry, 3; Raspberry, 3; Blackberry, Loganberry, and Himalaya Berry, 6; and Strawberry, 4.—G. F. W.

Gladiolus triangulus. By G. L. Lewis (S. African Gard., 23, p. 140; June 1933; fig.).—A new species from Bush River. Flower triangular in profile; floral segments recurved with crimson-lake lines on lower segments, and a darker tube; anthers mauve, reaching to half length of segments; leaves with half twist near apex.—F. J. C.

Homeria Illacina L. Bolus. By E. P. Phillips (Flow. Pl. S. Afr. vol. xiii, t. 502; July 1933).—A native of the Cape Province, producing from the corm, 3 narrow linear leaves (of which two are cauline) and a scape of about a foot long bearing cymes of lilac-purple starry flowers about 1½ inch in diameter. The plant bears a general resemblance to a Moraea.—F. J. C.

Hoodiopsis Triebneri. By Carl Luckhoff (S. Afr. Gard. 23, p. 231; col. pl.; Oct. 1933).—This is a new plant from Great Namaqualand for which a new genus has been established. It is allied to Hoodia, Caralluma, and Stapelia, but differs from the first two in having 2-horned inner corona lobes, and from Stapelia in having the inner and outer lobes united. The habit is that of a Stapelia with

a 7-9 angled stem and prominent teeth. It has a red-purple flower 6 inches across with spreading pointed lobes.—F. J. C.

Iris Helenae K. Koch. By O. Stapf. (Bot. Mag., t. 9333; Oct. 1933).— Native of Baku and its neighbourhood. A brownish flower with deep purple veins and blotches, growing about 6 inches in height.—F. J. C.

Lachenalia Comptonii. By W. F. Barker (Flow. Pl. S. Afr. vol. xiii, t. 507; July 1933).—A hispid-leaved species from the Karoo, with two wide short leaves and a raceme of about 20 small flowers with greenish spreading segments and exserted stamens.-F. J. C.

Lachenalia elegans. By W. F. Barker (Flow. Pl. S. Afr. vol. xiii, t. 508; July 1933).—A new species from Nieuwondtville with bluish flowers, short and sessile on the rather thick scape; nearly related to L. orchioides but with tubular flowers, segments of nearly equal length, and the leaf with a thickened brown margin.— \check{F} . J. C.

Lachenalia Gillettii. By W. F. Barker (Flow. Pl. S. Afr. vol. xiii, t. 506; July 1933).—A new species from Modderfontein, with two bright green rather wide leaves and a spike of about 40 white pink-tipped sessile flowers about $\frac{1}{3}$ inch long. From the nearly related *L. orchioides* it differs in having distinctly exserted stamens .- F. J. C.

Lachenalia Salteri. By W. F. Barker (Flow. Pl. S. Afr. vol. xiii, t. 504; July 1933).—A new species from the Cape Peninsula with two spreading leaves with upturned margins in their upper halves, and an inflorescence of about 20 bright rose flowers with very short pedicels. Remarkable for its late flowering. F. J. C.

Lettuces, Influence of Length of Day on. By M. A. H. Tincker (Gard. Chron., June 10, 1933, p. 404; 3 figs.).—An account of experiments carried out in the R.H.S. Gardens at Wisley during five years. They establish the facts that under summer temperatures and intense light little growth and no heart are produced under six-hour periods of light, and under winter conditions ten hours of light are needed for the formation of compact heads. Therefore in January and February at least three hours of additional electric light is recommended for trial until the natural length of daylight reaches eleven hours.—E. A. B.

Lilies, Fruits of. By A. Grove (Gard. Chron., Mar. 25, April 29, June 17, July 15, 1933; 22 figs.).—A well-illustrated account of the differences between fruits of certain closely allied species. Especially interesting are the wartiness of capsules of L. pyrenacium compared with the smoothness of those of L. pomponium, and these with the flanged valves of *L. chalcedonicum*; also the description of the dispersal by wind of the seeds of *L. giganteum*, so effectively imprisoned by the marginal teeth on any but a stormy day.—*E. A. B.*

By A. Grove (Gard. Chron., Aug. 20, 1932, concluded Feb. 4, 1933; numerous figs.).—A series of ten articles appearing at irregular intervals. They contain authoritative accounts of $L. \times kewense$, $\times Parkmannii$ and $\times Hoveyi$, the regale crosses sulphurgale and princeps, those with Martagon as one parent, the beautiful Maxwill, the Thunbergianum group, and Luther Burbank's work with Californian species. They are illustrated by a fine series of photographs.—E. A. B.

Loganberry and Raspberry Beetle (Byturus tomentosus), The Control of the: Experiments with Pyrethrum and Derris Washes and Dusts. By H. G. H. Kearns and C. L. Walton (Jour. Pomology, xi, 1933, pp. 39-52).—Further work has been carried out to test the efficacy of Pyrethrum washes—the degree of control of the larvæ depending largely on the duration of toxicity of the preparation after application. While Pyrethrum washes representing a concentration of 0.25 per cent. of the flowers did not provide a control, a one per cent. wash provided a higher control, but the results were inferior to those obtained with a much cheaper Derris wash.

Two applications of a Derris wash containing less than 0.004 per cent. Rotenone provided a high control of the larvæ—the first application being made ten days after the first third of the flower buds had opened, and a second

application ten days after the full flowering period.

A Derris dust (containing o 18 per cent. Rotenone) is effective in destroying the beetles when they cluster in large numbers on the unopened and just-opening flower buds. This dusting should be followed by at least one application of a Derris wash in order to kill the larvæ.—G. F. W.

Morea incurva Lewis. By L. Bolus (S. African Gard., 23, pp. 167, 168; July 1933; fig.).—A small flowered species with a single cyme of 2-4 bluish-lilac flowers with a yellow blotch at the base of each blade of the perianth. The inner segments are incurved.—F. I. C.

Narcissus Bulbs, Hot Water Treatment of. By L. N. Staniland (Jour. Min. Agric., xl, 1933, pp. 343-355; 5 figs.).—The object of the investigation was to ascertain whether the length of time of immersion of Narcissus bulbs could be reduced to control Stem Eelworm and to eliminate flower-damage.

Accurate and detailed information is required as to the time required to kill the eelworms when subjected to various temperatures, and the time taken for

bulbs of different sizes to heat to the centre to various temperatures.

The methods of recording the heating of bulbs of different varieties and the

measurement of bulbs are described.

The time taken to kill the eelworms and their eggs at 110° F. was determined as 17 minutes—the thermal death-point being 128° F. Standard (3-hour) treatments are, it is suggested, only rarely necessary—the minimum times for treatment for large "rounds" of different varieties varying from 40 to 80 minutes, while "double-nosed" bulbs of some of the larger varieties may require from 85 to 167 minutes.

The result of the work so far shows that as long as the bulbs are not given appreciably longer treatment than is necessary to kill the eelworms and their eggs, flower-damage practically disappears and the safe period for treatment is greatly extended. Shorter time of treatment does not, however, appear to reduce leaf damage, e.g. speckling and mottling.—G. F. W.

ical damage, v.g. specking and mothing.—c. 1. ...

Narcissus, Diseases of. By F. P. McWhorter and Freeman Weiss (U.S.A. Exp. Stat., Oregon, Bull. 304, June 1932, 41 pp.; 21 figs.).—This bulletin describes the more important Narcissus diseases which are known to occur in the Pacific North-West, discusses their relationships to diseases of other bulbs, and points out the general principles of control.

The diseases are classified into three main groups, viz.: Virus, Fungus and Eelworm. These groups are briefly discussed before the details concerning the

specific diseases are presented.

The eelworm disease is discussed under the headings of Symptoms of Attack, Diagnosis and Detection, and Control Measures, which include rogueing, crop rotation and hot-water treatment.

The only virus disease of importance is Mosaic or Grey disease, and a description is given of the symptoms on leaf and flower, while mention is made of other

troubles which may be confused with Mosaic.

Mention is made of the following fungus Diseases: (1) On the bulb, (a) Scale and Neck Rots—Wet Scale Rot, Dry Scale Rot or Black Scale-Speck, and Neck Rot; (b) Internal Scale Rots—Soft Rot, Basal Rot, and Root-Plate Rot. (2) On the foliage, Smoulder, Leaf Scorch, and Ramularia Blight.—G. F. W.

Pests, Garden: Their Detection and Control. By G. Fox Wilson (Gard. Chron., March 5, 1932, in continuation with numerous figures).—Twenty-three instalments of this useful series have appeared at irregular intervals up to October 28, 1933. They are well illustrated with numerous photographs, and the descriptions of insects, mites, eelworms, and other pests causing damage to garden plants are clear, concise and in less technical language than is usually met with. The remedies recommended are practical and well described, or prescribed, and if these notes were not so much scattered in the four volumes they would form a very valuable guide. The attacks are classified under such headings as buds, bulbs, flowers, foliage and fruit.—E. A. B.

Pine, a New Hybrid. By A. Bruce Jackson (Gard. Chron., March 4, 1933, p. 152; 4 figs.).—This is $Pinus \times Holfordiana$ being P. Ayacahuite Ehren. \times P, excelsa Wall., of which three trees were raised at Westonbirt.—E. A. B.

Raspberries, Loganberries and Blackberries III. Further Experiments on the Control of Byturus tomentosus Fabr. on. By W. Steer (Jour. Pomology, xi. 1933, pp. 19-37).—The main objects of this investigation were: (i) to obtain final field scale confirmation of the excellent results obtained in past seasons by spraying twice with Derris, and to standardize the Derris used; (ii) to follow up the promising indications with a Derris dust of known Rotenone content; and (iii) to attempt to kill the larvæ at a somewhat later stage in their development than was originally intended.

The trials of sprays and dusts on Raspberries, Loganberries and Blackberries are fully described.

The cost of spraying is discussed and recommendations are made as to the

most suitable time for spraying.

The results of the experiments indicate a choice of four methods of attacking the pest in the larval stage; they are: (1) Double spraying with Derris—first application for (a) Loganberries, 10-15 days after flowering begins; (b) Raspberries, 10 days after flowering begins; second application for Loganberries and Raspberries, 10-15 days later. (2) Single spraying—a thorough drenching spray on Raspberries and Loganberries during the last week in June. (3) Derris dusting—apply the dust to Raspberries and Loganberries about mid-June, and to Blackberries in early July. (4) Nicotine spraying—apply a Nicotine-soap wash (Nicotine, 8 oz.; soap, 8 lb.; water, 100 gallons) in late June and again in early July.—G. F. W.

Raspberry Beetle (Byturus tomentosus), A Note on the Control of the; by means of a Barium silicofluoride Wash. By H. G. H. Kearns and C. L. Walton (Jour. Pomology, xi. 1933, pp. 77-80).—A description is given of an experiment in which barium silicofluoride wash (12 lb. to 100 gallons of water, to which 10 lb. of soft soap had been added to aid the even distribution of the wash on the berries) was applied to Raspberries for the control of the Raspberry Beetle.

Results showed that the average percentage infestation on the control rows was 29.2; with pyrethrum (I per cent.), 24.4; while barium silicofluoride gave

The silicofluoride did not impart any bloom to the leaves or berries, but a number of the leaves on the fruiting canes were scorched. The hazard to health is said to be reduced to a negligible quantity, owing to the fact that its toxicity to warm-blooded animals is stated to be approximately one-twelfth that of lead arsenate.

The results obtained were sufficiently encouraging to justify further trials to determine the range of effective dilution of the wash and to secure data on the residue left on the mature berries.—G. F. W.

Raspherry Beetle, The Control of the. By F. R. Petherbridge and I. Thomas (Jour. Min. Agric., xxxix, 1933, pp. 1017-1028).—The importance of the Raspberry Beetle, Byturus tomentosus F., as a pest of Loganberries, Raspberries, and Blackberries is generally recognized.

The great expansion in the canning industry has emphasized the need for

effective control of this pest.

Brief descriptions are given of the various stages, together with short notes

on the life history.

Experiments which were carried out at various centres during 1931 and 1932 are described in detail. As regards the control of the pest on Loganberries the general conclusions reached are that a Derris dust (containing o 2 per cent. Rotenone) is the most satisfactory method at present known of reducing damage. The first dusting should be made before the blossoms open at the time when the beetles are feeding on the developing leaves of the new shoots. It may be necessary to make two pre-blossom applications in order to coat thoroughly the tips of the shoots. The whole of the plants should be thoroughly dusted when the flowers begin to open—this may require as much as 3 cwt. an acre or more, and the cost of this late dusting will be about £6 an acre. Good, but less satisfactory, control was obtained by spraying with Derris (0.2 per cent.) and soft soap about ten days after full blossom and again ten days later.

Regarding the control on Raspberries, no dusting experiments were carried out, but observations on a plantation at Cambridge showed that this beetle may be controlled satisfactorily by means of a Derris dust. Equally satisfactory results were obtained by spraying ten days after full bloom and again ten days later with both Derris (0.2 per cent.) and soft soap, and with nicotine sulphate (10 oz. to 40 gallons of water) and soft soap—the cost of the two washes being approximately equal. The point is stressed that whereas nicotine sulphate is a standard article, Derris powder is a product that varies in its composition.

Ĝ. F. W.

Raspberry Beetle as a Cause of Serious Blossom Injury, The Adult. By H. G. H. Kearns and C. L. Walton (Jour. Pomology, xi, 1933, pp. 53-55; r fig.).—The larva of Byturus tomentosus is the most serious pest of the Raspberry and Loganberry being responsible for the majority of the damage to the berries. The adult beetles are also responsible in some seasons for a serious reduction in crop.

The types of injury by the adult beetles are as follows:

- (I) The peduncle of the young buds are bitten through—the damage occurring more especially in the centre of the clusters.
- (2) The unopened bud is eaten into or eaten away completely.
- (3) The stamens and nectaries of the open blossoms are eaten away.
 (4) The entire flower is destroyed with the exception of the sepals.
- (5) The berries just set are eaten away, thus preventing the normal development of the drupes.

Injury by the adults is likely to assume serious proportions in seasons in which the climatic conditions favour the assemblance of large numbers of beetles on the Raspberries and Loganberries before the flowers open.—G. F. W.

Rhododendron megacalyx Balf. f. et Ward. By O. Stapf (Bot. Mag., t. 9326; Oct. 1933).—A large shrub of the Maddenii series from north-east Burma and Tibet with large white flowers and a pink-tinged calyx large for the genus. Hardy only in the south-west of England, flowering towards end of May.—F. J. C.

Rosa, Origin of Species in. By C. C. Hurst (Gard. Chron., Nov. 4, 1933, p. 347).—A practical application of cytological and genetical investigations to a recently discovered occurrence of a natural hybrid between R. Eglanteria and R. mollis. It is important as demonstrating the value of classification on a genetical basis, i.e. in terms of chromosomes and genes, to distinguish primary diploid species and to trace the evolution by hybridization of polyploid derivatives.—E. A. B.

Stapelia cylista. By C. Luckhoff (S. African Gard., 23, pp. 139, 140; June 1933; fig.).—A new species from near Klaver. Allied to S. nobilis from which it differs in its slender long stems, longer corolla tube nearly twice as wide as in S. nobilis, corolla lobes shorter and of firmer texture, and not ciliate, but hairy on surface.—F. J. C.

Stapelia Wilmaniae. By C. Luckhoff (S. African Gard., 23, pp. 139, 140; June 1933; fig.).—This new species from Barberton differs from S. Leendertziae by its much larger, more inflated, nearly spherical corolla tube, more richly coloured within, and by its corolla lobes being ciliate in the lower part.—F. J. C.

Strawberry Disease, On symptoms of, and on the occurrence of an Actinomycete in the tissues. By O. Banga (Mededeel v d. Landb. No. 15; Dec. 1931).—Reports the presence of an organism belonging to the Actinomyces which was isolated from many petioles and cultivated. The reaction to chitin was used for the presence of the organism, and no strawberry plant was found which did not give this reaction. The reaction was obtained from a number of other plants. F. J. C.

Sulphur in Vacant Glasshouses, Plant Injury following the Burning of. By W. H. Read and O. B. Orchard (Jour. Min. Agric., xxxix, 1933, pp. 1085-1087).—This note concerns the injury to the buds and growing tips of Chrysanthemums which frequently follows the burning of sulphur in Tomato and Cucumber houses prior to the introduction of the plants.

The type of injury is briefly described. It has been proved that the cause was the presence of zinc sulphate in the drip from overhead galvanized wires, and from the painted surfaces: the paint in all cases containing zinc oxide as the base. The condensation of moisture in the house is sufficient to cause a drip from the wires or structure, and zinc sulphate is thus carried in solution to the foliage and buds of the plants.

The maximum amount of zinc sulphate tolerated by Chrysanthemum plants without noticeable injury was one part of the ordinary crystalline salt in 300 parts of water.

There is no danger of the formation of sufficient zinc sulphate to cause drip

njury when sulphur is used for dusting purposes.

The trouble may be greatly minimized by thoroughly hosing down with water at frequent intervals, the operation being most effectively started when the interior of the house is wet, due to the presence of condensed moisture which will have dissolved part of the zinc sulphate. A dry atmosphere must be maintained where conditions are such that hosing down cannot be undertaken. Preventive measures include the substitution of naphthalene or formaldehyde for sulphur for fumigating purposes, and by the use of a paint with a lead or barium base.—G. F. W.

Tarsonemus approximatus Banks var. nareissi Ewing: A Variety of Tarsonemid Mite New to the British List. By A. M. Massee (Ann. Mag. Nat. Hist., xi, 1933, pp. 198-201; 2 figs.).—This variety of Mite was first recorded in this country in January 1932, having been found in a stock of Narcissus bulbs (var. 'Diadem') in Berkshire.

Mite-infested stocks of nine varieties of Narcissus have since been found in several counties; the indication being that the distribution is fairly general and

that the Mite is not of recent importation.

This pest is responsible for the so-called "loss of vigour" in many field stocks, and is capable of causing partial or complete failure of the flower crop, particularly in forced bulbs.

The original description of the Mite by Ewing is given.—G. F. W.

Tomato Leaf-mould by Spraying, The Control of. By W. F. Bewley and O. B. Orchard (Seventeenth Ann. Rept., Cheshunt Expt. Sta., pp. 39-41, 1932).— In certain circumstances ammoniacal copper carbonate with Agral I as a spreader has, while effective in checking the disease, caused scorching of foliage. Experiments show that Salicylanilide Paste $\frac{1}{8}$ oz. and Agral I $\frac{1}{4}$ oz. to I gallon of water checks the disease without damage to foliage. The spraying was repeated when the disease showed signs of recurrence. Salicylanilide is marketed as Shirlan Paste.—F. J. C.

Tomato, Spotted Wilt, An Important Virus Disease of the. By K. M. Smith (Jour. Min. Agric., xxxix, 1933, pp. 1097-1103; 1 plate, 3 figs.).—The specific Tomato viruses are those that cause the Mosaic diseases: ordinary Mosaic and Aucuba Mosaic; Tomato Stripe; and Spotted Wilt, which was first observed near Melbourne, Australia, in 1915.

The symptoms of attack are described in detail, and the identification of the

disease is rendered comparatively easy by means of a coloured drawing.

The chief method of distribution of the Spotted Wilt virus is by means of an insect vector, viz.: Thrips tabaci Lindl. The Thrips in order to become infective must feed in its larval stage on an infested plant. The primary symptoms of the disease develop, often in close proximity to the feeding marks made by the insect, some ten to twenty days after the first feeding by the Thrips upon a healthy Tomato plant.

About twenty members of the Solanaceae, other than the Tomato have been infected successfully with the virus of Spotted Wilt; these include the Potato, Tobacco, Thorn Apple (Datura), Henbane, Black Nightshade, Woody Nightshade, Deadly Nightshade, and Solanum Capsicastrum. Host plants other than Solanaceous plants include Dahlia, Aster, Zinnia, Lupin, Broad Bean, Broad-leaved

Plantain, and Tropaeolum.

The control of the disease resolves itself into the entomological question of the control of the insect vector, *Thrips tabaci*. The destruction of Thrips in glasshouses is not an easy matter, but the pest may be kept down by careful spraying with a paraffin-nicotine emulsion and by nicotine fumigation. Infestations of Thrips in the flowers of glasshouse-plants may be controlled by broadcasting Grade 16 naphthalene over the plants at the rate of 10 oz. to 1,000 cubic feet of space.

Care should be taken to prevent the persistence of the disease from season to season on other glasshouse-plants and on weeds.—G. F. W.

Trumpet Creepers. By E. Anderson (Bull. Pop. Inf., Arnold Arb., Ser. 4, vol. i; Jan. 15, 1933; pl. and figs.).—It is pointed out that many of the "trumpet creepers" in cultivation in America are hybrids between Tecoma grandiflora and T. radicans (the generic name Campsis is used in this Bulletin). The hybrid is named T. Tagliabuana Vis. or Campsis Tagliabuana (T. hybrida Jouin), and presents considerable variation, the variety 'Madame Galen' being specially mentioned. F. J. C.

Tulip Species, Notes on. By A. D. Hall (Gard. Chron., May 6, 1933, p. 316).—Cultivation and observation at the John Innes Horticultural Institution have led to the following conclusions: Tulips known as violacea, pulchella and humilis should be regarded as embraced under one species, and the name T. humilis of Herbert, as the earliest, should stand. That sent from Kashmir as T. chrysantha is a diploid and a new species, probably the source of the two tetraploid species T. chrysantha and T. stellata.—E. A. B.

Tulip, Transmission of Breaking. By A. D. Hall (Gard. Chron., May 13, 1933, p. 330; fig.).—An account of experiments in the insect-proof greenhouse at the John Innes Horticultural Institution, with regard to the three known types of

breaking, full, self and clotted, as transmitted by aphides. The aphis Myzus persicae proved the most active transmitter causing full break. The species Macrosiphum Gei, though in less degree, proved to be capable of transmitting the virus. Anuraphis tulipae, though negligible as a transmitter through the flowering plant is a powerful source of infection when attacking bulbs in store.

Other experiments suggest that by the time the petals are falling the flower stem is sufficiently detached from the new bulb to prevent the infection carried by aphis reaching the latter. Clotted break apparently occurs only in Tulips like Zulu and Isis, of intense colouring.—E. A. B.

Turnip, A Disease-resisting. By W. M. Findlay (R. Scot. Coll. Agr., Bull. 37; 1931; figs.).—A yellow-fleshed variety of Turnip with a purple top called "Bruce" is reported as resisting attacks of club-root so far as the bulb is concerned. The roots are liable to attack, but the proportion of usable roots on infected land is high.—F. J. C.

Vaccinium comestibles, Les. By Y. Trochain (Rev. Bot. Appl. et d'Agr. Trop. 13, Bull. 139; March 1933).—Discusses the cultivation of Vaccinium macrocarpum (American Cranberry) and V. corymbosum (Blueberry) as carried out in the United States.-F. J. C.

Vine Weevil, Biology and Control of the. By F. F. Smith (U.S. Dep. Agr. Tech. Bull. 325; Sept. 1932; 45 pp.; 16 figs.).—Brachyrhinus (Otiorrhynchus) sulcatus Fab. is a well-known pest of field and glasshouse crops in Europe, North America, and Australia.

The recorded host-plants number 52, while 25 new hosts are added as a result

of recent investigations by the author.

The symptoms of attack on its several food plants are described and figured. The life history and descriptions of the egg, larval, pupal, and adult stages are

described in great detail.

The following recommendations for control are made: (1) Preventive measures: (a) the removal of infested plants from the glasshouses before the emergence of the adults; (b) the disposal of soil in which larvae are present; (c) steam sterilization or prolonged submersion in water of infested soil before it is used again as compost; (d) the elimination of all outdoor hosts about the glasshouse; and (e) the erection of barriers or screens during July and August to prevent the entrance of Weevils into glasshouses. (2) Remedial measures: (a) to mix lead arsenate thoroughly with the potting soil at the rate of 1-2 oz. to a bushel to poison the larvæ as they burrow into the soil in search of roots; and (b) to apply calcium arsenate-hydrated lime dust, poisoned bran bait, or poisoned apple bait to the host plants in July to destroy the adults before egg-laying commences.—G. F. W.

Waste Chemistry. By H. E. Armstrong (Jour. Soc. Chem. Ind. 51, pp. 359-363; April 1932).—The author develops the theme which he began in his address to the R.H.S. Conifer Conference in an address given in January 1932 before the Royal College of Science Chemical Society. He refers to "Nature's ways of putting us to shame by utilizing waste, not merely to her own profit, but with consummate art and inevitable beauty of effect." He refers to Conifers and the remarkable series of waste substances produced by them: plant perfumes, plant colouring matters, plant alkaloids, advitants—i.e. accessory food factors—coal. The whole matter is too complex to summarize, but "Nature, in some way, has not only learnt to decorate herself with her waste, but has even raised it to functional value and significance."—F. J. C.

Winter Spraying of Orchards with Particular Reference to the Control of Red Mite and Apple Capsid Bug. By J. Carroll and E. McMahon (Jour. Dep. Agr. Irish Free State, xxxi, 1932, pp. 190-198).—This paper deals chiefly with the results obtained during 1931. Laboratory and field investigations were designed principally with the object of testing further the combined tar-distillate and mineral oil sprays, those that were used being two proprietary oil sprays, two proprietary and two home-made combination tar-distillate and oil sprays (4 per cent. of the oil constituent and 6 per cent. of the tar-distillate constituent).

The results obtained show that both the home-made and proprietary combination sprays gave a very good control of Red Mite, Aphis, and Apple Sucker.

The last part of the paper deals with the biology of the Apple Capsid Bug, Plesiocoris rugicollis, and the possibility of obtaining a more satisfactory control of this pest by means of a delayed dormant oil spray. -G. F. W.

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Winter Spraying Trials against the Apple Capsid Bug on Mixed Varieties of Apple Trees. By Harper Gray and H. E. Brooks (Jour. Min. Agric., xl, 1933, pp. 630-635; 1 fig.).—A series of trials to test the comparative values of seven winter washes on sixteen varieties of Apple were carried out during January and February 1932 in an orchard at Newton Rigg, Cumberland.

Analyses of attacked blossom shoots and fruits were taken after spraying, the

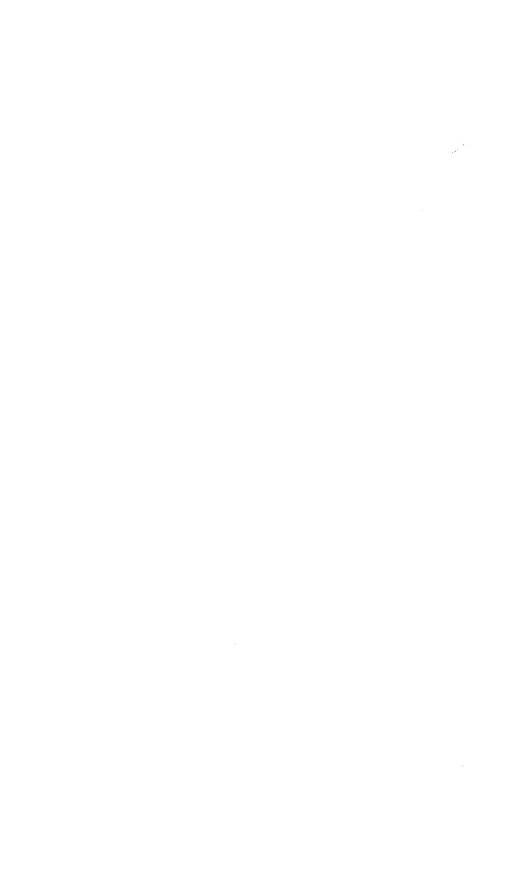
results being set out in tabular form.

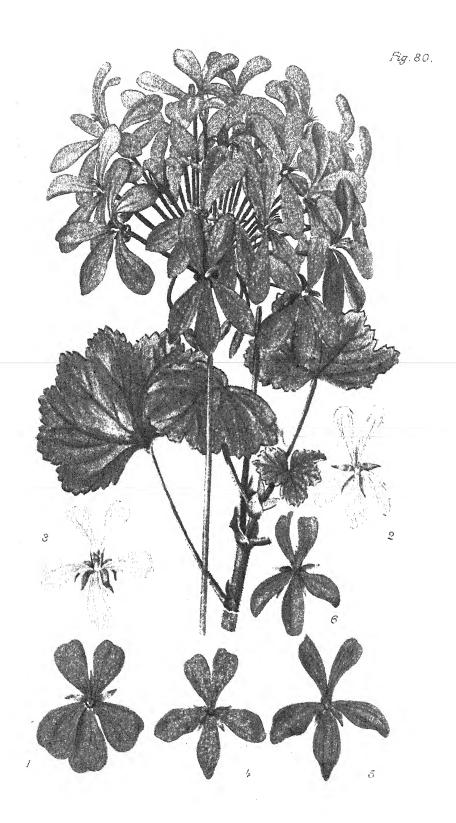
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The indication is that a great deal of variation of efficiency of a wash exists

over an orchard containing many varieties of Apple.

The best general control over Capsid damage was obtained with (i) a proprietary mixed wash at 10 per cent. concentration; and (ii) a tar-distillate wash at 5 per cent. mixed with a mineral oil emulsion at 7½ per cent. concentration.





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PELARGONIUM × KEWENSE.

By Sir A. W. Hill, K.C.M.G., D.Sc., F.R.S.

Pelargonium x kewense is a very effective garden plant both for the greenhouse and for planting in the open in the summer, as it maintains a fine display of flower all through the summer months. In the warmer parts of the country it will usually live through the winter in the open. It has always been considered to be a distinct species and was for many years called P. inquinans at Kew, until the true P. inquinans was satisfactorily recognized and determined. Its hybrid nature was suspected in 1932, when seedlings were raised and flowered from seed which ripened in my own garden in 1931 on some plants growing in the open which were naturally fertilized. As only plants of this "species" were being grown and no other Pelargoniums were in the garden, or anywhere near, it may be assumed that the flowers were pollinated either by their own pollen or with pollen from adjacent similar plants. Four seedlings were raised, and when they flowered all had the flower form of the parent with narrowly obovate, clawed petals, but in colour they all differed from the parent plants. One of the seedlings (fig. 80, 3) had pale pink flowers exactly like those of P. zonale (fig. 80, 2); a second (fig. 80, r) had bright scarlet flowers, in colour exactly matching those of P. inquinans, but the petals had not the rounded shape typical of that species; the third seedling (fig. 80, 5) had rich crimson-scarlet flowers-a very fine colour; while the flowers of the fourth seedling closely resembled those of the parent, but the colour was of rather a deeper hue.

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A plant was also self-fertilized carefully in the Royal Botanic Gardens, and of the resulting fourteen seedlings thirteen resembled the parent in flower colour, but one was identical with my own crimson-scarlet flowered seedling (fig. 80, 5), raised from the plants which seeded naturally in my garden.

It was therefore decided to repeat the experiment with full precautions during 1933. Two plants of $P. \times kewense$, labelled A and B, were crossed both ways and flowers on both plants were also self-fertilized. From the seeds ripened from the self-fertilized flowers of the plant (A) fourteen seedlings were raised, but only three have flowered at present; two of the seedlings have produced pink flowers like those of P. zonale, while the flowers of the third exactly resembled those of its parent. The plant (B) also yielded fourteen seedlings from the "selfed" flowers, four of which have flowered this summer; three bore pink zonale-like flowers and those of the fourth exactly resembled its parent. Of the seedlings resulting from crossing (A) and (B), five seedlings were produced on (A) used as the female, but none of these has yet flowered. From the plant (B), crossed with the pollen of (A), eight seedlings resulted; two of these have borne flowers, one being exactly the same as the parents, the other having brighter-coloured flowers.

In all four batches of seedlings a good deal of variation is to be seen in stem hairiness and leaf marking. Neither parent plant shows conspicuous, if any, zonation on the leaf, but 37 per cent. of the seedlings show more or less conspicuous zonal bands on the leaves, especially on the youngest seedling leaves. With regard to hairiness, seven seedlings have very few hairs on the stems and leaves, while four have markedly hairy stems.

As it was found in my own experiment that the scarlet and crimsonscarlet flowered seedlings were very late in flowering, it is hoped the remaining thirty-two seedlings will bear flowers during the present year.

It is of interest to record that as the result of self-fertilizing my own pink-flowered *zonale*-like seedling, the single resulting seedling almost exactly resembled its parent, bearing similar pink flowers.

All my own four seedlings were self-fertilized during 1933 and a batch of seedlings has been raised, some of which have already given interesting results.

Of the twenty-five seedlings raised from self-fertilizing the crimsonscarlet flowered plant, fifteen have now come into flower, and all exactly resemble one another in their flower colour, and are identical with those of the parent plant (fig. 80). In addition their leaves are exactly similar, with the main crenate lobes rather triangular than rounded in outline and with a distinct zonal band. In fact it is possible to pick out the seedlings from the others by their leaf characters alone.

It should be noted that the leaves in all the seedlings resemble those of $P. \times kewense$ and that the leaves of the pink-flowered seedlings

are not like those of P. zonale, but show the coarse lobing of true P. inquinans or of P. \times kewense, and show no trace of the more finely serrated margin found in P. zonale.

All the seedlings, however, showed a deep zonal band on the youngest, first-formed leaves, which is usually scarcely noticeable on the leaves which develop later.

The results described show certainly that our long-cultivated Kew plant is not a true species, nor was it known in South Africa until a plant was sent to Kirstenbosch from Kew after my visit to the Cape in 1930–31. The flower colour of the seedlings suggests that $P. \times kewense$ may be a hybrid between P. inquinans L. and P. zonale L., but so far the few seedlings which were produced from this cross at Kew some three years ago closely resembled their parents (out of ten seedlings nine were like inquinans and one like zonale). The experiment was not continued at the time as the question of the origin of $P. \times kewense$ had not then arisen, but it would be well worth while to make the cross P. zonale and P. inquinans in both directions and follow the experiment into the second and third generation.

P. × kewense, as it seems desirable to call this valuable garden plant, has been grown at Kew for many years and its origin here is unknown. It has always been propagated from cuttings and thus uniformity has been maintained. It may be that our plant is the Pelargonium hybridum referred to in the list of plants grown at Kew in 1853, but unfortunately we have no certain record.

It is well known that when the various species of Cape Pelargoniums were introduced to this country great interest was taken in the genus, and hybridization of the species was one of the special activities of keen gardeners. It seems likely, therefore, that $P. \times kewense$ may be one of the results of these activities and that P. inquinans and P. zonale may be its parents.

P. inquinans L. bears bright scarlet flowers with broadly obovate petals and crenately-lobed leaves without—except perhaps when quite young—any zonal band; P. zonale L., on the other hand, has pink flowers with narrow obovate or strap-shaped petals and bears leaves with a slightly upturned margin, the margin being slightly serrated or denticulate; moreover the leaf is not crenately lobed, and does not show the five rather pronounced lobes characteristic of the leaf of P. inquinans. P. × kewense, as has been pointed out, resembles P. inquinans (as found growing wild in the Karroid Addo bush scrub—Uitenhage Division) more closely in its leaves, but the shape of the petals is similar to that of P. zonale.

Since both pink zonale-like flowers and flowers with the brilliant scarlet colour of P. inquinans have been produced by the seedlings of P. \times kewense, though the flower-shape of P. inquinans has not been reproduced, it seems reasonable to assume that P. \times kewense may be not only an early hybrid form, but also that P. inquinans and P. zonale are its parents.

The following description of $P. \times kewense$ has been drawn up by Mr. R. A. DYER, Assistant for South Africa at Kew, who knows the Pelargoniums well in their native home.

P. × kewense R. A. DYER; hybrida nova, affinis P. inquinanti L. et P. zonali L., ab illo foliis leviter zonatis minoribus pubescentibus, petalis angustioribus minus cruento-rubris, ab hoc florum colore, foliis minoribus moliius pubescentibus lobis crenatis differt.

A small, moderately branched bush 25-50 cm. high when in flower. Branches round, 6-7 mm. thick, soft towards the tips, becoming hard with age, hairy. Leaves petiolate, the petioles 4-7 cm. long; the lamina reniform-orbicular, more or less broadly cordate at the base, shortly 5-lobed, crenate or crenate-dentate on the margin, up to

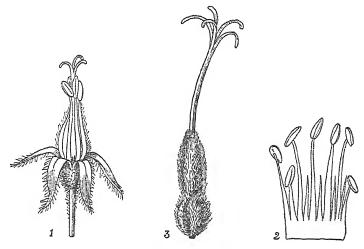


Fig. 81.—Pelargonium x kewense.

r, with petals removed, shows reflexed calyx segments, stamens and style.
2. Stamens; only two of the inner whorl bear anthers as a rule.
3. The densely hairy ovary, with the hairy beak and the style.

5 cm. long and 5-7 cm. wide, moderately thick but hardly fleshy, zonal marked round the centre, the intensity of the colour varying according to age and conditions of cultivation, covered on both surfaces with short hairs; stipules ovate or lanceolate, I-I·4 cm. long, 5-8 mm. broad, soon becoming membranous. Peduncles arising opposite the leaves, 6-Io cm. long, shortly hairy, each bearing up to twenty-seven flowers. Bracts subtending the pedicels numerous, similar to the stipules in shape but smaller, deciduous. Flowers pedicellate; the pedicels 3·8-4·7 cm. long, with the fused nectariferous calyx spur extending nearly to its base, shortly glandular-hairy with longer simple hairs interspersed. Sepals lanceolate or oblonglanceolate, acute, 9-II mm. long, thinly covered with long hairs on the outer surface. Petals obovate or elliptic-oblong, crimson-red, the three lower ones 2-2·2 cm. long, 7-9 cm. broad, rounded at the apex; the two upper ones somewhat narrower, rounded or emarginate at the

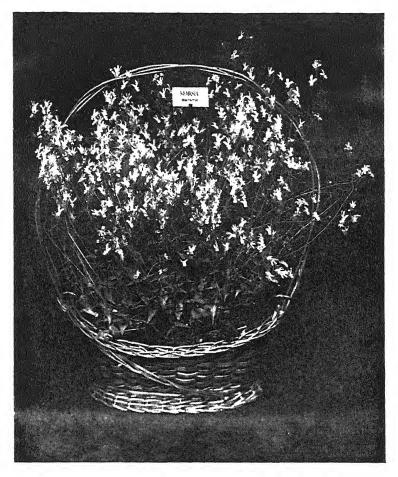


Fig. 82.—Nemesia macroceras. (p. 219)

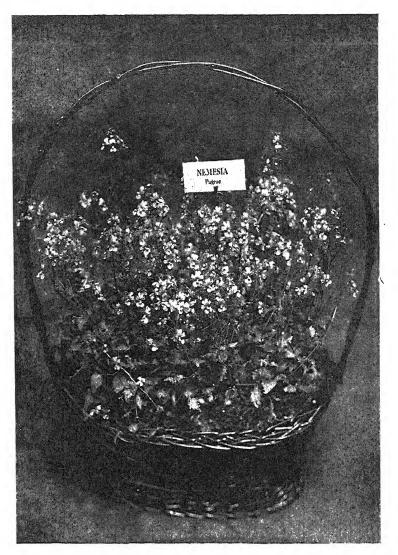


Fig. 83.—Nemesia Pageae. (p. 219)

apex. Stamens ten, of which only seven produce fertile anthers; the five opposite the sepals about equal to the calyx; the two opposite the petals shorter. Ovary densely hairy, the beak elongating in the fruiting stage.

Described from a plant of unknown origin cultivated at the Royal Botanic Gardens, Kew. The specimen figured is preserved under the number P. 101.

EXPLANATION OF PLATE (fig. 80).

- P. x hewense.-Note the crimson-red flowers with rather narrow obovate petals and leaves without a zonal band. This plant was self-fertilized in 1933 and is exactly similar to the plant self-fertilized in 1932. (Nat. size.)
 - I, P. inquinans.

 - 2, P. zonale. 3-6, Seedlings from a plant of $P. \times$ hewense self-fertilized in 1932.
- 3, Flowers closely resembling that of *P. zonale*; 4, flower similar in colour to *P. inquinans* but with the narrow petals of the parent; 5, flower colour a richer shade than *P. inquinans* and with narrow petals rather longer than those of the parent *kewense*; 6, similar in colour to the parent plant but of a rather deeper shade of crimson.

SOME SOUTH AFRICAN ANNUALS.

By A. P. BALFOUR.

[Read March 6, 1934; Mr. T. HAY, V.M.H., in the Chair.]

THE South African flora has been attracting considerable attention in this country lately. Kew has sent out at least two expeditions, and wide collections of specimens have been made on behalf of the Gardens and Herbarium within the last ten years. Several Fellows who are well known to us have also visited the country and brought back a rich harvest of plants and seeds, and what is more, have shown us how to grow them with success in our own gardens. In addition. all will remember the exceedingly interesting collection of wild flowers sent over by the South African Government and exhibited before the Society last October.

Although, undoubtedly, the most interesting part of the South African flora from a botanical point of view is the permanent plants, the annuals play an important part in the brilliant masses of colour produced at certain seasons of the year, and in brightening the countryside by the lightness and grace of their habit, and so softening the often rather harsh effect of many of the xerophilous plants. In some districts, too, they even provide a useful addition to the food supply for stock.

Now every good gardener, when cultivating a new plant, tries to find out the conditions the plant is found in in Nature, although this information must be used merely as a guide to the general treatment of the plant, and by no means slavishly followed in the garden. The majority of the South African annuals come from the south-west corner of the country, in Namaqualand, where the rainfall, when it comes, is in winter and early spring. Some are to be found on the plateaux of the high veld, often in large colonies, as, for example, Dimorphotheca, Ursinias, and Venidiums. Others, such as Nemesias, Lobelias, and Heliophila, grow among rocks on the slopes of kopies and alongside rivers, and in this position are often to be found trailing through the more permanent vegetation.

When the rainfall is good, germination and early growth is rapid. Should a hot dry spell intervene, the plants commence flowering prematurely, set a few seeds, ripen them, and die. But if the moisture continues with the cool nights prevalent at that time, vegetative development has time to take place, and the plants eventually make a perfect blaze of colour. We see then, that to get the best developed plants, we must aim at fairly cool, moist conditions throughout the early stages of growth. This is best accomplished by getting the plants out into their flowering positions early and in a fairly established condition. This particularly applies to the South of England, where there is always a risk of a sudden, hot, dry spell in early summer, which may cause a check to the young plants from which they never properly recover.

For example, with Nemesias, by sowing as early as the first week in February in gentle heat, pricking off into trays, and growing on in cool conditions in cold frames, and finally potting singly into 48's in a fairly good loam, magnificent fully developed plants can be had by the middle of May, just coming into flower. They will then even stand a few degrees of frost, and if planted out into well-prepared land, will be in full flower by the end of the month. The plants should then be 18 inches high and 12 inches across, carrying a mass of flowers right up to the end of July. I am now talking of the risk of a sudden hot spell in May, but given a fairly normal English summer, and particularly a showery May and June, all the South African annuals will thrive in this country, especially if we get bright spells of sunshine in between. It is of utmost importance, however, to see that the plants are given plenty of time in the early stages, and on no account pushed or allowed to become drawn.

Another lesson which we learn from their native conditions is the necessity of an open position, with abundance of light and air. The soil should be well drained and well cultivated, with the addition of a good supply of humus, to get the best developed plants.

In addition to their value as decorative garden plants, many of the South African annuals show certain botanical and biological characteristics which decidedly add to the interest of growing these plants in a garden. For example, in Arctotis and Dimorphotheca, it will be noticed on a sunny morning that all the flowers are inclined towards the east, facing the rising sun. They will then follow the sun round during the day until it sets, changing back to the eastern position during the night. This movement is due to the action of the sun on the stalk just below the flower head.

The effect of the intense radiation which takes place on the high veld at night is shown by the mechanism adopted by many of the Composites for closing the ray petals over the flower heads, to prevent damage to the pollen by damp. Contrary to the usual belief, this has been proved, at least in the case of Dimorphotheca, to be due to the action of the cooling of the atmosphere rather than the want of light. The cooler air acts on the upper surface of the petals, causing retardation of the growth; and the lower surface, growing more quickly, causes the flower to close. This closing of the flower heads, while of biological interest, reduces the value of the plant horticulturally, but the brilliance of their colouring and freedom of flowering undoubtedly outweigh this disadvantage.

The colours usually met with among the Composites, which form by far the largest Order, are white, and various shades of yellow and orange, although brilliant scarlets, reds and blues are also represented. Other Orders represented among the annuals are the Scrophulariaceae and a few Campanulaceae and Cruciferae. The last two are mostly blues and whites, while all colours are represented among the Scrophulariaceae, and one genus, Nemesia, is remarkable for the widest range of colour I know in a plant when found in its wild state. It is an amazing fact that practically all the colours represented in gardens to-day in *Nemesia strumosa* are to be seen in the native plant.

Another point of interest is to be found in the seeds and fruits of many of the South African annuals, especially in their variety of shape and varying formation of the pappus. I hope to mention some of these in detail as we go on.

I often wonder if the average gardener realizes what an interesting study the form, colour, methods of distribution, and even smell, of many of our garden flower seeds can be. There was a most interesting innovation at Kew this autumn in the shape of a collection of various fruits, mostly of trees and shrubs, but including some herbs, in the house for plants of unusual interest. I am sure that those who saw this collection were astonished at the beauty of form and colour. Although it might not be quite so spectacular, I am sure a collection of seeds (and I am using the word in its horticultural sense) would be an eye-opener to many people, and the variety of form of those of many of the South African annuals would be an interesting feature of such a collection.

In looking at the South African annuals as a whole, it is interesting to note that, as a rule, in habit of growth, they are more slender and diffuse than those we find in Europe and California, and are on the whole more suited for light soils. For this reason, combined with the brilliance of their colouring, many of them make most admirable decorative subjects when planted in fairly large groups and as cut flowers massed in bowls.

In deciding what species I should describe to you this afternoon in detail, I thought it might be most useful to take a number of those which have been brought most prominently before the public in the last few years, touching on some of their main characteristics and how they have behaved in English gardens. I should also like to include a few varieties and species not yet generally offered.

I think I cannot do better than start with Nemesia, which, after all, is probably the most widely grown South African annual in gardens to-day. One of the great characteristics of this plant is, as I have indicated, the extraordinary range of colouring to be found in the species Nemesia strumosa. Although N. strumosa has been known to botanists for probably a hundred years or more, and is found in the wild state within fifty miles of Cape Town, it was not until only forty years ago that it was introduced into this country. I have already touched on the cultivation of the Nemesia. In addition to its uses for the open ground, it also makes a very useful and easily managed pot plant for the cool greenhouse, and with management can be had in flower eight to nine months of the year. It is also admirably suitable for use as cut blooms, the flower stems lasting in water for easily two or three weeks.

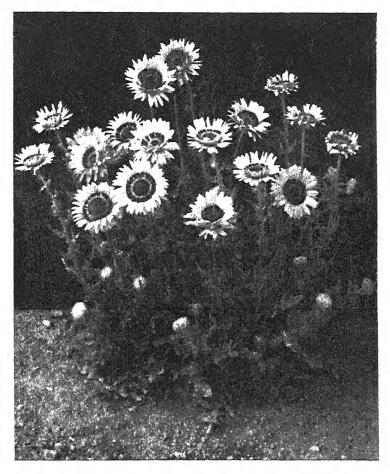


Fig. 84.—Venidium fastuosum. (p. 220)

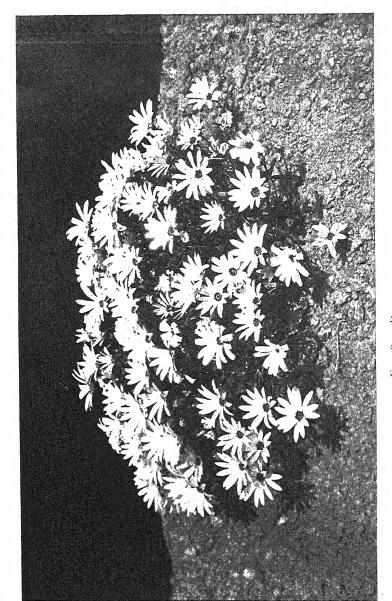
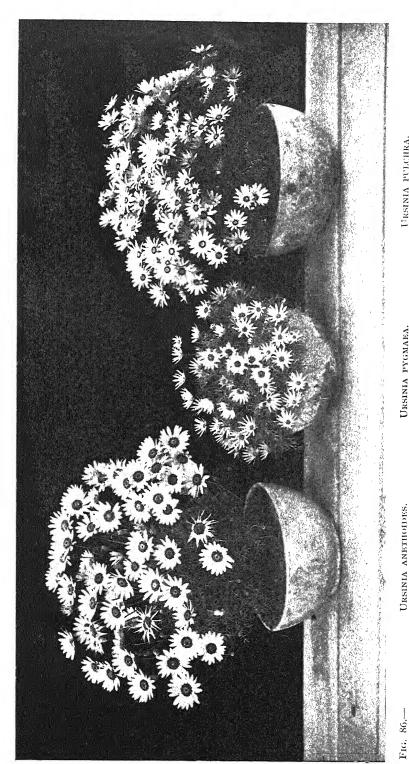


Fig. 85.—Dimorphotheca. (р. 220)



URSINIA ANETHOIDES.

URSINIA PULCHRA.

Ursinia pygmaea. (p. 222)

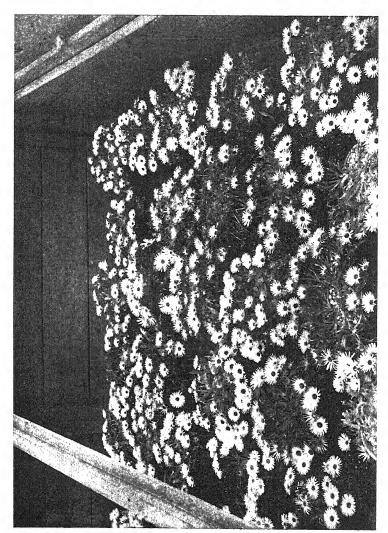


Fig. 87.—Mesembryanthemum criniflorum in frames at Slough. (p. 223)

I will not trouble you with a list of varieties but you all know they can now be had in every conceivable shade of colour, true to name. There is a compact, small-flowered strain called Hybrid Nemesias, derived mainly from N. versicolor, and another now called Large-flowered Compact, from a cross between N. strumosa and N. versicolor types. The main efforts of the plant breeder have been to improve the habit and separate the colours to breed true. Properly handled, the most wonderful effect can be had where the colours are skilfully blended, and especially as the plants, when well grown, are quite compact and literally covered with colour for several weeks on end.

It was inevitable that, with such a good horticultural plant as N. strumosa, gardeners should try other species, but none appeared of much horticultural value until we obtained seeds a few years ago of two or three quite interesting species, through the kindness of the John Innes Horticultural Institution, from the Lewis Grant collection. I shall not have time to give a detailed description of each species. but the main characteristics are: rather a loose habit, with slender stems, free flowering, flowers smaller than N. strumosa, and many with prominent horns, the whole effect being very light and graceful when the plants are well grown and full of flower. The species we have found most distinct are N. macroceras, N. anisocarpa, N. ligulata, N. floribunda, N. azurea, and N. Pageae. N. macroceras (fig. 82) has pale vellow and mauve flowers with long, narrow horns on the upper lip, and slightly fragrant; N. ligulata is rather stronger growing and has slightly larger flowers, pale yellow and orange; N. anisocarpa is somewhat similar, but with richer colouring; N. floribunda has small, pale vellow and white flowers borne on crowded racemes, and is slightly fragrant. N. azurea is more like N. strumosa in habit, with fairly large blue-mauve flowers, while N. Pageae (fig. 83) forms a neat little bush o to 12 inches high, very freely branched, and covered with small bright cerise-red flowers, with a prominent rich yellow cushion on the lower lip. Unfortunately, these species are rather more capricious to handle than N. strumosa, being more difficult to raise, and succumbing more easily to unsuitable weather conditions. They want a light but neither hungry nor dry soil, and must on no account have a check in the young stages, nor be allowed to get drawn when raised under glass. However, they are undoubtedly worthy of a place and will make a definite appeal to the plantsman. They look quite at home in an open, not too hot, part of the rock garden and do admirably as pot plants for the cool house.

I come now to the very interesting family of Venidium. These are typical South African plants, and all come from the high plateau of the open veld.

They commence flowering in their native country during the late winter and very early spring, after the rains. The nights are usually extremely cold at that time of the year, and I am sure a mistake is often made in this country by coddling the plants too much in the 220

early stages. The same applies to several of the South African annual plants.

The most striking species of Venidium is undoubtedly V. fastuosum (fig. 84). This is a well-known weed in South Africa, where the flowers are much used for cutting. There, even in gardens, they are often left to sow themselves with excellent results, and I have heard of good success in this way in the Scilly Isles. Unfortunately, the seeds are difficult to germinate, and even in their native country one sometimes gets the seed lying dormant in the soil for a year or more. Sowing is best done about the middle to end of March in gentle heat, in a very welldrained compost. When well developed, the plant attains a height of 2 to 3 feet, and 18 inches to 2 feet across. Foliage and stems are soft and grey-green in colour, and covered with glistening hairs, particularly the large, woolly-looking flower buds, which are very attractive. The flower stems, often twenty to thirty on one plant, rise well above the foliage, making it a useful plant for cutting. The colour of the flowers, frequently 4 to 5 inches across, is brilliant orange, with a sharply defined purplish blotch at the base of the petals, surrounding a shiny black disc, which sets off the rich orange admirably. Although they close in dull weather, the closed flower buds are most attractive, with their glistening grey woolly involucre. It is a desirable plant for mixed borders, and for growing among shrubs in an open, sunny situation.

V. calendulaceum is probably a perennial in its native state, but is best treated as an annual in this country, by sowing in gentle heat in March. It does not usually come into flower till rather late—in July—but when it does start it produces large quantities of its golden-orange flowers until frost comes. This is a plant for a hot, sunny bank, or even the top of a wall or a raised stone edging, where it thrives. Of dwarf spreading growth, with large, deeply lobed, dull green leaves, flowers like the Marigold (hence its name) about 2 inches across, of a yellow or orange-yellow colour and very useful for cutting.

Other species and forms of Venidium have been tried. A straw-coloured form like V. fastuosum, which Mr. HAV showed under the name of V. macrocephalum, received an A.M. a few years ago. Several other species are now being tested at Slough from seeds collected in the wild in Namaqualand—one with branching flower stems and small yellow, freely-produced flowers which we hope will be useful for hybridizing. Another promising form is a dwarf form of V. fastuosum, which, if we can induce it to produce viable seeds, will be a most useful bedding plant.

I should like to describe to you now some species of another Veld Daisy, and one of the very best of recently introduced plants from South Africa, Dimorphotheca (fig. 85). All know D. aurantiaca, with its brilliant orange flowers, and its colour forms, Apricot, Lemon, and various intermediate shades known as hybrids. On light land in the South of England this plant may be sown in April in place with perfect success; on heavy, colder land and elsewhere it is better to raise in

gentle heat and plant out in May. It makes a most useful plant for edgings, groups in borders, or for bedding schemes, and also lasts well as cut flowers in bowls or low vases. It was given the high Award of Garden Merit by this Society a few years ago (see JOURNAL R.H.S. 55, 276).

- D. pluvialis is similar in habit, and bears white flowers with an attractive inky reverse to the ray petals. A recent form of D. pluvialis, called ringens, is a great improvement on the type, the pure white flowers being admirably set off by a blue-black zone round the disc.
- D. chrysanthemifolia is really a low shrub, producing very large, soft yellow flowers on long stems. The foliage is striking, being bluegreen, the shape resembling that of a chrysanthemum leaf. I find this plant is best sown in July in this country, in a cold house, potted on, stopping once when a few inches high, and finally flowered in 8-inch pots, being wintered in a cool house with all the air and light possible. Be very sparing with the water-pot during the winter. The plants will commence flowering in May and keep on till July. The flowers have the good quality of remaining open in dull weather better than those of any Dimorphotheca I know.

Another very distinct species, and one with horticultural possibilities when a crop of seed can be obtained, is *D. pinnata*. The habit of the plant is trailing, the flowers smaller than *D. aurantiaca*, and pinkish buff in colour, leaves small and pinnate, giving a light, feathery appearance to the plant. This is what Mr. Mathews says of the plant in the latest issue of the Journal of the Botanical Society of South Africa, just published:

"One plant of *D. pinnata* will always remain a memory of the Doorn River bank, Namaqualand. It was the pale, salmonbuff coloured variety, trailing down a smooth-faced boulder for three feet and two feet wide—a starred mass of delicate foliage and flowers—something to emulate, but entirely elusive to the present."

Another species sent to us from Namaqualand was a strong spreading form after *D. pluvialis*, with immense, glistening white flowers fully twice as big as other species. This has decided possibilities.

D. Ecklonis is a useful, late-flowering, semi-shrubby form, bearing white flowers with attractive deep blue centres.

Two other species deserve mention, D. Barberae and D. spectabilis. The former has pale, rose-pink flowers, but has the disadvantage of being rather shy and late-flowering. The flowers of D. spectabilis are produced singly on long stems, and are of an attractive rich wine-colour with a deeper centre, but unfortunately are few in number, and rather late to open for this country. Both these species, I believe, are perennial in their native home, and where massed must make very fine garden plants. There is a possibility they may both be very effective as bedding plants in a warm, sunny climate. Crosses with both species have failed to set seed so far.

You may remember that I mentioned earlier that the different forms of the seed of some of the South African annuals was of great interest. As most of you know, "Dimorphotheca" means two forms of seed vessel. The "seeds," or, botanically speaking, fruitlets, of the same flower head are of two forms, those of the ray florets being angular and rugose, while those of the disc florets, if formed, are flat and winged.

Another member of the daisy family, whose value has only recently been fully realized, although known in gardens for many years, is the large family of Ursinia. The sub-genus Sphenogyne is now placed under Ursinia. Ursinia speciosa and U. anthemoides were both introduced into this country many years ago. For some reason, apparently only the comparatively dull U. anthemoides remained in general cultivation, and the more attractive brilliant orange-coloured species was lost, until re-introduced to general cultivation in this country a few years ago. The showy U. anethoides (fig. 86) was first shown before this Society by Mr. HAY, and received an Award of Merit, and the following year Mr. HAY proved its value as a garden plant by producing a fine bed of it in full flower in Hyde Park. This has been followed by U. pulchra and then later U. pygmaea.

When well grown, *U. anethoides* makes a bushy plant 12 to 15 inches high, from which the slender flower stalks rise well above the fernlike, bright green foliage. The flower heads droop in rather an attractive way when in bud, and gradually become erect as the flowers open. The flowers are 2 to 3 inches across, of a bright orange colour, with a rosy-crimson zone at the base of the petals. They usually remain well open right up to the evening.

U.pulchra is a dwarfer plant with lighter orange flowers and a very narrow crimson zone (fig. 86).

U. pygmaea is dwarfer still, and of a more spreading habit, the self-coloured flowers being more star-like and of a richer orange (fig. 86).

Another species which was included in our collection last year, and attracted favourable notice, is rather after *U. anthemoides* in habit, but more compact and with flower stems rising better above the foliage. The colour of the flower is lemon, with an orange zone at the base of the petals. It is a promising plant which has not yet been named.

A plant which is often associated with *U. anethoides*, at least under glass, is *Heliophila linearifolia* or *H. longifolia*. This is a slender plant, rising in a single, freely branching stem with small, four-petalled blue flowers with a white eye, very valuable on account of its true speedwell blue colour. It succeeds best as a pot plant for the cool house, sown early in spring. In light soils in fairly moist seasons, it makes a good plant for a massed clump in the mixed border outdoors. Probably the best way is to sow in place fairly late in April, in suitable positions.

When talking about blue flowers, mention must be made of the Felicias, now often put in the genus Aster. Although mostly shrubby

Fig. 88.—Zaluzianskya sp. (p. 224)

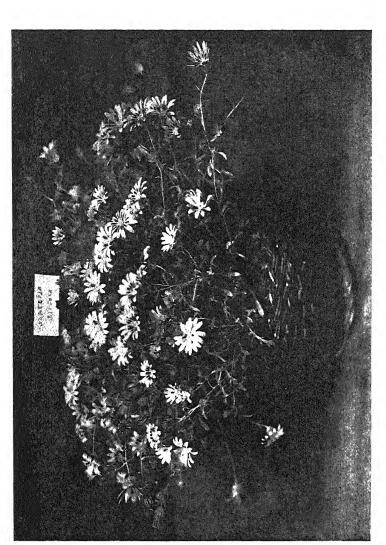


FIG. 83.—Gorteria diffusa. (p. 226)

[To face p. 223.

perennials, some of the Felicias are annuals, with small blue or lilaccoloured, daisy-like flowers, and some of them are decidedly worth cultivating. *Felicia Bergeriana*, sometimes known as the Kingfisher Daisy, is a low, spreading plant only a few inches high, with small vivid blue flowers carried on short stems. Unfortunately, the flowers are very sensitive to climatic conditions, the ray petals curling up at any time during the day when either the sunlight is not sufficient, or temperature drops. When you are lucky enough to catch the flowers full open, they are a joy to behold.

Another annual species which makes a most useful pot plant is F. adfinis. This makes a much taller and stronger growing plant than F. Bergeriana, and the flowers, borne on stems 8 or 9 inches long, are a deep blue and, having more substance, keep open better. In a cool house a pan of, say, 6 or 8 plants massed makes a welcome addition during the summer months.

Major Stern sent us seeds of a good shrubby form, named by Kew as Aster Pappei. This is in appearance a narrow-leaved form of the well-known Agathea coelestis. I believe it succeeds very well in Major Stern's favoured garden outside, but with us in Buckinghamshire it is only suitable for cultivation under glass, where it makes a valuable winter-flowering pot plant for the cool house.

The large family of Mesembryanthemum is mostly composed of succulent perennial plants. One annual form, Mesembryanthemum tricolor, has been grown in gardens for many years, and is useful for edgings and dry banks. A somewhat similar plant, but with a much better range of colour, and rather larger flowers, has been introduced recently, named M. criniflorum (fig. 87). Easily raised from seed sown in gentle heat in March, and planted out in May, it quickly forms a low growing plant a few inches high and 9 to 12 inches across, completely covered by the end of June with starry flowers of delightful soft colouring. These include white edged with rose, pink, and buff, and self colours of primrose, apricot, and crimson. It is useful for the rock garden and as an edging outside, and also as a pot plant in frames or cold house.

Two other Composites which have a very wide range in South Africa, and which give us some brilliant coloured flower forms, are Arctotis and Gazania. Although most of them are perennials in their native country, quite a number of them can be treated very successfully in this country as annuals by sowing in heat in the early spring and planting out in the end of April and May.

Among the Arctotis, one annual of distinct merit is the well-known Arctotis grandis. This may be sown in the open where it is to flower, or under glass and planted out in April. It has a bushy habit and grows 2 to $2\frac{1}{2}$ feet high; the flower heads are carried on long stems and are 2 to 3 inches across, the ray petals being silvery white tinged with mauve, and the disc a dark steel-blue or purple, surrounded by a narrow golden band. The whole plant is covered with white down, and it flowers continuously the whole summer.

The perennial forms include A. breviscapa, A. scapigera, A. laevigata, and A. acaulis. A. breviscapa forms a tufted rosette of dull green, pinnate leaves, from which arise quantities of flower stems 12 to 15 inches high. The flowers are various shades of orange-yellow, and some show a brown or narrow blue marking at the base of the petals. This is the earliest of the perennial forms to flower, and in favourable weather it continues in full flower the whole summer.

A. scapigera is somewhat similar in habit, but forms a more vigorous and taller growing plant.

A. laevigata and A. undulata are somewhat similar in habit, and, as far as we are concerned, for horticultural purposes, we make no attempt to keep the species separate, but offer the seeds in mixture. The flowers of these species show a wide range of colouring, including orange, yellow, red, buff, straw and wine shades—a beautiful mixture in sunshine. They thrive on a well-drained sunny spot, and will last in full flower from July to September.

The remark made with regard to getting out early applies with special force to these perennial forms of Arctotis and Gazanias. The finest Arctotis we ever had were from an early spring sowing, and planted out at the end of April in the open where they had to endure night frosts on several occasions.

The Gazanias are somewhat similar in habit and appearance, although not generally so tall. One of the most striking species is *G. pavonia*, which has rich red flowers, spotted with brown at the base of the petals, and narrow, shining green leaves with the undersides covered with a white felt.

The well-known *G. splendens* is easily raised from seed, and the rich orange flowers with the characteristic black and white markings at the base of the petals make it a useful plant for sunny banks, and for furnishing the rock garden in summer.

A form of great promise has come to us from Namaqualand, namely, G. scabra var. pinnata. This forms a neat, compact plant, with the usual narrow, shining bright green leaves, with white reverse; the flowers are very large and fully 4 inches across, the petals being rich orange with a longitudinal band of scarlet running down the centre, with the characteristic brown blotch and white spots at the base.

My next subject (fig. 88) has got a dreadful-sounding name to English ears, being named after a Polish botanist, Zaluzianskya, often known as Nycterinia. Two annual species are worth growing, Zaluzianskya capensis and Z. selaginoides. The former makes an upright plant, 12 to 15 inches high, with white flowers opening only at night and then very fragrant. The reverse of the petals is brownish, rendering them very inconspicuous during the day. Why the flowers should close up during the day is not very clear, but in this case the interesting theory has been put forward that the brown reverse may attract the heat of the sun, as it has been proved that flowers not well insolated during the day do not open at night, and after a good day's insolation the effect is sufficient to ensure periodic opening

for several days on end. The shape of the flower is attractive, similar to that of Phlox, with five deeply divided, two-lobed petals.

Z. selaginoides is much dwarfer and bushier in habit, with rather smaller flowers which vary in colour from white to pink and even crimson, with a small orange centre. The flowers remain open most of the day, and the plant makes a regular little bush a few inches high, covered with small starry flowers, the whole effect being rather like an old-fashioned print pattern. This species does quite well sown in place in spring, in the open in well-drained soil.

My next subjects are all annuals shown last year for the first time in London, and were included in our collection put up before this Society last June.

The Cotulas belong to the Composites, and some of the annual South African species are worth a place in our gardens, and will be very useful as carpeting plants, for edgings and dwarf groups in the mixed border, and even, if annuals are allowed, in the rock garden.

Cotula barbata forms a tufted plant, only a few inches high, with small, narrow, bright green leaves. The flower heads are bright yellow, about ½-inch across, and are distinguished by having no ray florets. They are borne on stems 4 to 6 inches long, and stand out over the plant like hat-pins in a pin-cushion.

There is another annual species with larger flower heads, lemon in colour, borne on longer stems, with pubescent foliage, giving a soft silky appearance to the plant.

Tripteris is another member of the Compositae. Two species have been found useful at Slough. *Tripteris hyoseroides* forms a branching plant, 2 feet high and 18 inches through, with orange-yellow flowers, $1\frac{1}{2}$ to 2 inches in diameter, and dark maroon disc, borne on long stems. The foliage is attractive, slightly glaucous, with reddish stems. Leaves sessile, entire, edges slightly sinuate and toothed.

T. confusa is similar to the above, but is more compact in habit, and the flowers a richer orange. Like Dimorphotheca, they may be sown in place in light, warm land, but on our land we usually raise in gentle heat and plant out in May. They have the great quality of remaining in flower most of the summer, but unfortunately, they belong to a very strict trade union, and insist on closing shortly after 3.30, even on a sunny day. Some species are so numerous in places in the Karroo that they form an important part of the food for the farmers' stock.

Sutera belong to the Scrophulariaceae, most of the species being under-shrubs. An annual which was shown last year, and proved of some interest both in the open border and as a pot plant for the cool greenhouse, is *Sutera Dielsiana*. This forms a freely branching plant, 18 inches to 2 feet high, covered in mid-summer with smallish flowers, much resembling the old-fashioned Pelargonium of greenhouses. The colour is mauve or white with purple-maroon markings. It is best treated as a half-hardy annual. One of the shrubby forms shown by Mr. HAY a few years ago is *S. grandiflora*, a cool greenhouse plant,

easily raised from seed, and forming in the second year a shrubby plant 2 to 3 feet high, with pale lilac-coloured flowers, very useful for cutting.

Two more annuals, and I am afraid I must stop—both members of the Compositae. The first is Gorteria diffusa (fig. 89), a most interesting, low, spreading plant, growing 6 to 8 inches high, and 12 inches or more across. The flowers are somewhat buried in the long involucral bracts, the ray petals being rich orange in colour, with curious irregular, brown markings, the reverse being a shiny greeny-blue, which is very noticeable when the flowers close, or are in bud. Place the plant in the hottest, sunniest part of the garden. The seed distribution is interesting, there being no pappus, but the flower heads become detached whole, the bracts becoming hard and spiny, thus attaching themselves to the coats of passing animals.

Finally, Senecio aremarioides, a member of a large, prolific family. The late Mr. Leonard Sutton was very taken with this plant when on a visit to South Africa. I think he saw it in masses at Kirstenbosch. Its height in the open is about 18 inches, freely branching, in appearance like a miniature form of the well-known Cineraria stellata of greenhouses, and with a wide range of colours, mostly pinks of various shades, bronze, and yellows, with the usual groundsel-like foliage. Sown early in the year, and brought on slowly in pots, it makes an attractive pot plant in full flower, for the cool greenhouse, by mid-May.

There are several more subjects I should like to have spoken about —Lobelia, Wahlenbergia, Hebenstreitia, Diascia, and others—but time does not permit. I hope, however, I have been able to draw some further attention to a most interesting set of plants, interesting alike to the gardener, the plantsman, and the pure botanist.



Rhododendron Laponnicum Series.

RHODODENDRON LAPPONICUM AND ITS ALLIES.

THE general conception of a Rhododendron, at any rate among the majority of those who attend our meetings and read our Journal, has undergone considerable change during this century. In the latter half of the nineteenth century the name Rhododendron conjured up pictures of majestic evergreen shrubs bearing in their season, among their large and glossy leaves, great clusters of large flowers striking in their colours and magnificent in their pose—how magnificent they could be HOOKER'S introductions and his great book on the Rhododendrons of Sikkim had shown us.

Comparatively few knew anything of the small-flowered species, and none realized what vast areas of the world are covered with them, or had the least conception of the variety of their forms.

Not until the flora of the high lands of inland China was explored was the wealth of species revealed, and the fact that Erica and Calluna, which form so great a feature of our own mountains, are there replaced by almost innumerable and almost infinitely variable forms of Rhododendron.

A few of these dwarf species were known. LINNAEUS had named one, Rhododendron lapponicum (Bot. Mag. 3106), which grew in Lapland, a small shrub only a few inches high, with densely scaly branches and leaves, and purplish flowers. R. setosum (Rhodo. Sikkim Himal. t. 29) was known, rather taller, and with brighter flowers, from the mountains of Sikkim and Southern Tibet, and R. parvifolium (Gartenfl. t. 904) from the alpine marshes of Kamschatka, Sakhalin Island, and the mountains of North-east Asia to the Altai and Lake Baikal, growing up to 18 inches and having pale, rosy-magenta or white flowers.

These three plants were better known to botanists than in gardens, and botanists had begun to learn of other related species through the French missionaries in West China, but it was not until the explorations of Wilson, Forrest, Ward, and others, that it was realized that these species were but the outliers of a vast array that covered moors and clung to rocks in the high solitudes of the tremendous hills of Yunnan, Szechwan, Kansu, and the borders of Tibet. There on open cliffs, on moorlands, in alpine pastures, and on open, grassy slopes, sometimes in stony land, sometimes on humus-covered boulders, sometimes in peaty fields, at times in bogs, at times on limestone rocks, they grow.

In general appearance they are like the plant depicted in the painting by Miss Snelling which accompanies this note. They are generally low shrubs—the tallest up to 3 or 4 feet high, but generally dwarfer, often intricately branched, sometimes forming a mat. The

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branches are usually scaly, and so, at least on their undersides, are the small evergreen leaves. As a rule the flowers appear in spring, generally in twos or threes at the ends of the branches, of the general form shown in the illustration. They may be mauve, pink, or purple, or sometimes yellow.

This is the general appearance, but within this range the variation in detail is almost infinite, and consequently a large number of species have been named and described. Many of these descriptions will be found assembled in The Species of Rhododendron, pp. 387–436, published in 1930, and others have appeared since.

Whether all these species will ultimately stand is perhaps doubtful. At any rate, so far as the gardener is concerned those that are to be regarded as distinct must not need a lens to discriminate between them, however necessary one may be to distinguish the characters upon which their botanical differences depend.

The important fact for the gardener is that many of them can be grown with a little care, and will well repay that care.

Though some, in Nature, grow on limestone, and while here and there one may like to try them on limestone in the garden, on the whole it is safer to say that sandy peat is the soil for them. Given that, they make excellent rock shrubs, and are perhaps better planted on the slopes of a mound than on the flat. At home they generally seek the sun, and in our islands where the air is moist they thrive in the sun and are best there, but where the air is often dry, as in the Eastern Counties and parts of the Thames Valley, it is better to give them partial shade.

When E. H. WILSON sent home his first seeds, this group of plants had a good introduction into gardens, for among them was *R. intricatum*, which was acclaimed as a blue Rhododendron—a prize indeed. It is true that it was blue only by comparison with, say, *R. ponticum* at its harshest, but it was an attractive novelty and introduced these dwarf species to the knowledge of many who might otherwise have overlooked them.

These species are easily raised from seed, and flower within a comparatively short time from seed. We have known *R. chryseum*—one of the yellow-flowered species—for instance, to flower within 15 months of seed sowing, 18 months from the time the seed was collected on the great Salween-Mekong Divide.

There are three or four yellow-flowered species in the group, but most have flowers of some shade of purple.

It would serve little purpose to give a full list of the species, but a few may be mentioned as distinct and easy to grow besides the yellow R. chryseum and R. flavidum. There are, for instance, R. cantabile, with dark violet flowers, R. intricatum, mauve (Bot. Mag. t. 8r63), R. hippophaeoides, taller, with rose flowers, R. fastigiatum, erect, with light purple flowers, R. idoneum, making a cushion with deep purplish flowers, white in the throat, and the more erect R. scintillans, with layender-blue flowers.

These species, constituting the Series Lapponicum, form but one group of the dwarf Rhododendrons. There are several other groups or series of these dwarfs, and their introduction has made available a great number of beautiful plants for our gardens, and particularly for our rock gardens. The difficulty of cultivating some of them adds to the zest of the cultivator, but there are others that can confidently be left almost to look after themselves.

F. J. C.

MUSHROOMS.

By W. M. Ware, M.Sc.

[Read February 6, 1934; Edwin Beckett, Esq., V.M.H., in the Chair.]

It is probably true to say that science, in relation to the art of agriculture and horticulture, advances in three stages. Being the younger, it has first to learn the established practice of the farmer or the gardener in any particular branch. Secondly, it may draw level with and even explain the methods of the practical man; but the third stage, viz. that of actually guiding, comes always last of all and usually only when the relationship between science and practice has been long sustained.

Many branches of horticulture, as everyone knows, can present great difficulties to the practical man, and it is then that science is particularly useful; sometimes, however, it may be added, its help is neither welcomed nor afterwards appreciated.

In the cultivation of Mushrooms, with which we are now concerned, it will be agreed that, while the practice is as old as any, there have been few opportunities for an outsider to learn the established practice because of the secrecy preserved. The grower of Mushrooms has jealously guarded his slight knowledge and shrouded the process in such mystery that he appears now to stand aloof and be completely isolated. The result of this reticence, maintained for generations, is that, when some difficulty presents itself, these most secret growers are actually behindhand in their knowledge, and are coming into the open to bewail the fact that nothing is known about such things as substitutes for stable manure or how to stop the ravages of a certain mite.

It is consequently unfortunate that the newcomers, at a time when the Mushroom-growing industry in this country has room for expansion, should find but little help at hand when they desire to progress or to overcome difficulties.

The present account of Mushroom-growing, it may be stated immediately, is largely founded upon information provided by growers of experience, as well as upon some personal acquaintance with the practice. From this it is apparent that not all Mushroom growers are so secretive as may have been inferred, and full acknowledgment is made to those who have not only discussed the known details of the art but also have pointed out where information is lacking. The veil of secrecy has been lifted, and it is at once revealed that to grow Mushrooms successfully both skill and close attention to detail are necessary. A guide to the methods to be employed and a survey of the whole subject has already been published by the Ministry of Agriculture and Fisheries in their Bulletin 34, and in the space now available it is

possible only to give a short account and to touch upon certain features of special importance or interest.

The first of these is undoubtedly the recent expansion of the industry in England. This is attributed to the duty of 8d. per lb. placed on imported Mushrooms, it being estimated that imports of Mushrooms to the value of at least £500,000 per annum are being replaced on the market by home-grown supplies—a replacement which provides a great opportunity for the British grower. The industry, however, both in England and on the Continent, is a very old one, and has been most famous in proximity to some of the capitals, e.g. Paris, Vienna, and London. In the United States, although established later, it has made great strides, and at the present time the most authoritative information comes from that country.

The commercial cultivation of Mushrooms is carried out entirely by means of specially prepared beds of composted stable manure, and meadow-growing, which has received public attention after one particularly good summer, is not here considered because the season is short and conditions are out of the grower's control. Manure for the beds must be carefully chosen. It should be fresh stable manure. stored in a place free from washing by rain; it should be from cornfed horses and should contain plenty of straw litter. If straw is lacking, more can be added when the heap is first made up for composting. Owing to the very rapid rate of decomposition, the softer straws are to be avoided and wheat or rye straw preferred. The state of the manure when it arrives on a grower's premises varies greatly and its subsequent management must consequently also vary. Much depends on the source of supply, and perhaps the farmer who can store up and accumulate a heap of manure from his own stables is in the most favourable position—he can order the making of the compost from the very beginning. Other growers obtain supplies from towns or from cavalry barracks or racing stables, and this manure arrives on occasions after an unknown series of treatments; it must be dealt with in the way best suited to its condition.

The first step is to build up a heap of any convenient length, about 5 feet high and 6 feet wide, flat at the top and with vertical sides. This heap, except perhaps in a dry summer, must be made under a shed with roof but with little side protection. All these requirements are directed towards securing an even fermentation of the heap. At the start, the moisture-content must be accurately judged and, except in the case of certain manure obtained from town contractors, a small quantity of water is applied with the rose of a water-can to make all the manure moist, as it is thrown up in making the heap. Dry patches require special attention. In summer, watering can be done more freely than in winter, but at all times great care is needed not to make the heap too wet. Pressure on the heap should be avoided—tight packing prevents correct fermentation. Heating and steaming of the heap should begin within a day or two: if after several days the manure is still cold, the condition can sometimes be rectified if the

cause can be found. Thus, for example, lack of moisture will prevent heating. After about a week the heap is turned; for this purpose two men are usually employed and with forks they throw the manure back from one end of the old heap and so start a new one. Great care is taken to place all manure from the outside of the old heap into the centre of the new; watering of dry patches is carried out when required, and all cohering lumps are well shaken out. The new heap is built up with sides as vertical as possible, but when doing this the compost should not be beaten into position.

Further turnings are given at intervals of three or four days: the number of turnings varies from two to seven and depends on the rate of decomposition of the manure. A period of about three weeks is usually sufficient, and the condition of the compost is judged to be correct if it is dark brown in colour and possesses a sweet and quite unoffensive smell. It should be tested by taking from inside the heap a long double handful which is "sheared off" by twisting the hands in opposite directions; if it is too tough to shear easily, the compost is not ready and the heap should be turned once more. The correct moisture-content is estimated by firmly squeezing a handful; the compost should become compressed by the fingers but drops of liquid should not be exuded and the palm of the hand should be found only just moist and certainly not wet. If a handful be squeezed close to the ear, a wet condition is revealed by the sound of squelching or bubbling. Full attention has been paid to the preparation of the manure, for it must be emphasized that the condition of the medium on which Mushrooms are to be grown is of the greatest importance, many of the failures experienced being traceable to wrongly made compost.

The beds may be of the flat or ridge type. Flat beds are of such a width that picking can be done on any part without inconvenience, and they are usually 6 to 10 inches deep. They are used for indoor work, on the floor or on shelving. Ridge beds are commonly 21/2 feet at the base; they have sloping sides and are about 2 feet high. This type is employed for out-of-door growing; for indoor use the ridges are made slightly smaller. In constructing the beds, the manure is pressed firmly while it is still steaming hot, the amount of pressure depending on the moisture present. If in correct condition, the beds may be trodden, but if rather too wet they should only be beaten down with a fork. After making the beds, their temperature should be watched—it will probably rise to about 140° F., but after a week or ten days it will steadily fall. Often a vigorous growth of moulds appears on the surface, but it seldom does harm. It indicates fully moist conditions and can be stopped if desired by providing good ventilation to dry the surface. When the temperature is on the downward grade and has reached 70° F. it is safe to plant the spawn. Fragments of spawn are inserted in the manure just below the surface; they may be as small as a walnut, but it is preferable to employ rather larger pieces, of about the size of a hen's egg. These are planted in rows at about one foot spacing.

After ten days, if the temperature of the beds is near 60° F., growth of mycelium from the edges of the spawn-fragments becomes apparent by a white fluffy development of hyphæ. The mycelium gradually spreads on the nearest pieces of straw, which are covered with the white hyphæ, their dark brown colour becoming changed to a lighter tint. Outdoor beds must be covered with a thick layer of straw from the time they are made, this being removed and replaced at every operation. Indoor beds need not be covered with litter except in places with a heated and dry atmosphere or in draughty buildings, where its chief function is to prevent drying of the manure. In very cold conditions the litter helps to preserve some warmth in the beds, but it must never be imagined that the compost is actually a hotbed; in reality the beds are seldom warmer than the air of the building. When by inspection it has been found that growth of the spawn is taking place, the beds are cased. This consists of applying 1½ inch of soil to the surface of the manure, the earth being just moist enough to be beaten down firmly with a spade to make a porous, level covering. premises long used for Mushroom-growing or where digging space is limited, it is advisable to use subsoil in order to avoid the occurrence of a fungus disease of Mushrooms known as "Bubbles" and caused by Mycogone perniciosa. Casing ridge beds is an art best learned by experience. After casing, the covering of litter may be replaced if thought necessary, but in most indoor places it can be dispensed with.

A period of waiting for the crop to appear now follows, during which it is only needful to see that the casing soil does not become too dry. It is best to maintain a condition of dampness, but the casing should never be made wet. In buildings where controlled heating is available, the temperature before the crop appears may be profitably kept between 60° F. and 65° F. provided that the beds are not allowed to dry out. With this temperature, a thin covering of moist litter is useful. In cold, unheated buildings the period of waiting for the crop may be as long as five months, but in warm conditions it may be reduced to five weeks.

When the first Mushrooms appear, the amount of watering may be increased slightly. It is most important to realize that the watering is to maintain a certain degree of moisture in the casing soil and should never be so heavy as to penetrate to the manure beneath. At all times it is beneficial and advisable to keep the pathways and walls in a moist state so that, by evaporation, some moisture is always available for humidifying the atmosphere.

The types of buildings used for Mushroom-growing are numerous and variable, and certain conditions are peculiar to each one. It is impossible here to deal with the management of the beds in all the different circumstances met with in farm buildings, caves, special Mushroom houses, frames, and glass-houses. During cropping, the optimum temperature is about 55°F. Between 50° and 55° the Mushroom growth is comparatively slow, but the best quality is produced and there is less liability to attack by insect pests and fungus diseases. Between 55° and 60° a more rapid development of the Mushrooms is

secured, and probably most commercial growers keep the air temperature between these limits. There is a possibility that strains of Mushrooms vary slightly in their temperature requirements, but the chief reason for the employment of this higher range of temperature is that the total crop which the beds are capable of producing will be gathered in a shorter space of time. The duration of cropping depends mainly on the temperature; it may be more than six months where 55° F. is not exceeded, as in caves, but is more commonly 2 to 3 months where the temperature is liable to rise as high as 70° F.

Between 60° and 70° F. cropping may continue satisfactorily if the humidity can be maintained, and although there is reason to believe that some Mushroom strains will thrive in this heat, it is certainly inadvisable to run up the temperature purposely. During summer, of course, it is unavoidable. The heating of Mushroom-houses is usually by means of hot-water pipes, which should preferably be kept clear of the beds both on account of the difficulty they present when the time comes to remove the old compost and also on account of the drying effect they have when in proximity. Oil stoves should not be used in houses during cropping unless the fumes can be caused to escape by a special pipe. Mushrooms are very susceptible to mineral oil or its fumes, and it is found that under this influence deformities result, and mis-shapen gills are formed on the upper surface of the caps.

Picking should be done frequently and no Mushrooms should be left on the beds in the fully mature condition. The picking is done with a turning and twisting movement, and all stumps are later removed by digging them out of the casing soil, the holes being filled up with fresh earth. Buttons, cups, and broilers are graded separately and Mushrooms of different colours are not placed in the same basket. It is usual to pack them with the gills upwards to prevent discoloration of the lower layers.

Unfortunately Mushroom-growing is not without its difficulties, and, like other crop plants, the Mushroom is liable to be attacked by both fungus parasites and insect pests. The commonest parasitic fungus disease is known as "Bubbles," on account of the drops of liquid which appear on the very much deformed Mushrooms. This is caused by Mycogone perniciosa, a fungus which is now believed to be brought into the Mushroom house in the casing soil. To avoid it, care should be taken to dig soil which has not been used for cultivation, or to use subsoil. In places where there is a danger of digging as casing soil any earth which may have been contaminated with former Mushroom-bed material, even many years previously, and where it is impossible to avoid using it, a method of heating the soil is recommended, for it is known that the fungus cannot withstand 50° C. (= 122° F.) for even one hour.

In addition to this preventive measure, the strictest cleanliness should always be maintained in and around the Mushroom houses. If once the disease becomes established it is difficult to eradicate and can only be dealt with by measures of sanitation. Verticillium

Malthousei and Cephalosporium Constantinii are two further fungi both of which are capable of causing deformity of the Mushroom. Cephalosporium lamellaecola forms a white cobweb-like growth on the gills but does not affect other parts of the Mushroom. One other disease remains to be mentioned; this is caused by a bacterial parasite, Bacterium Tolaasi, which affects the upper surface of the caps and causes brown blotches. The origin of the bacteria is not known, but observation has shown that they usually attack under conditions of ample moisture, the discoloration being found, for example, most commonly at the place of contact of Mushrooms when they are growing in clumps. As a method of control it is suggested that, after each sprinkling or watering, the ventilators and doors should be opened with the object of drying the surface of the Mushrooms, but not for so long as to dry the casing soil or pathways.

Some fungi, though not actually parasitic, can cause great loss through their invasion of the beds. Wherever they grow in quantity the Mushroom mycelium is restricted in its spread and the crop is as a rule reduced. The White Plaster Mould, Monilia fimicola, is perhaps the commonest; it forms large white, almost dusty, patches in the compost, and resembles a deposit of powdered chalk or plaster. The Mushroom-bed Sclerotium, Xylaria vaporaria, is another invader of frequent occurrence. Its white mycelium fills the manure of the beds, and its resting or sclerotial stage is found in the casing soil in the form of black fleshy bodies which are frequently branched and fused together in tangled masses which can be removed in handfuls. A third invader of the beds is a white toadstool (Clitocybe dealbata) which grows in large clumps and is recognized by its peculiar smell, its pale whitish gills, and its wavy-edged caps.

The fungi parasitic on Mushrooms, as every grower knows, are to be regarded as a serious danger, and, immediately their attacks are recognized, advice should be sought from this Society or from the Advisory Mycologist stationed in the area. With further information gained on the occurrence of the various diseases, after proper identification, knowledge of the life-history of the fungi causing them will accumulate, and consequently improved ideas on methods of control.

Pests of the Mushroom crop are numerous and all too common, and require continuous vigilance and immediate measures of control on the part of the grower. The larvæ of either the Phorid or Sciara flies, or of the Cecid midges, are met with in nearly every Mushroom house, while springtails, mites, and wood-lice are not infrequently the cause of damage. Among the larger pests which cannot be disregarded are slugs, mice, rats, and moles.

In conclusion it may be said that in spite of this very formidable array of diseases and pests, the Mushroom crop is not only continuing to be grown but it is grown on an increasing scale year by year, and it is remarkable that those who once begin are completely taken up by their interest, apart from possible financial returns, in the true art with which they are concerned.

THE ROYAL SOUTH LONDON FLORICULTURAL SOCIETY.

By W. Roberts, F.R.H.S.

THE progress of horticulture in England was for centuries a slow one. It advanced step by step as other countries yielded up their fine plants and useful vegetables and fruit. But the general principles of cultivation remained pretty much the same from one generation to another; and failure more often than success at first attended introductions from overseas, chiefly from ignorance of the natural environment of these early additions to our gardens.

This slow progress and these time-sanctified traditions of cultivation received such a series of shocks during the first half of the nineteenth century that gardening underwent a complete revolution. It may be said indeed that within the period indicated horticulture made greater advances than in any two previous centuries: it passed from empiricism to a science. Progress had been no less rapid in nearly every other branch of human activity. In industries other than gardening the changes were largely a matter of evolution from within; in gardening the pressure came from without and from many sides. The moneyed classes, that is the owners of large gardens and employers of regular gardeners, were not so much concerned with the quality or variety of what their gardens produced, as with the quantity; and the gardener continued in the traditions of his father and his grandfather in producing these supplies. Means of communication between the owners of gardens, and more especially between those who worked in them, were few and costly. Those who made discoveries of practical value had no means, and possibly no inclination, of publishing them for the benefit of the country at large. There were no newspapers and few periodicals devoted to gardening and its various ramifications, until J. C. Loudon started the Gardeners' Magazine in 1826; now and then the Gentleman's Magazine or one of the other monthly periodicals would contain accounts of some new method of cultivating some plant, fruit, flower or vegetable; but monstrosities, such as enormous radishes or cabbages, had a far better chance of publicity than purely practical matters.

These were, in effect, the conditions which prevailed when the Royal Horticultural Society was started in March 1804, and they continued to exist until a good many years after the Society had become established. The avowed object of the Society was "to collect every information respecting the cultivation and treatment of all plants and trees, as well culinary as ornamental," and to "foster and encourage every branch of horticulture." The Royal Caledonian Horticultural Society dates from a meeting held in Edinburgh in

December 1809, the object of which was "to encourage and improve the cultivation of the best fruits, of the most choice flowers, and of the most useful culinary vegetables."

So far as the Royal Horticultural Society was concerned, apparently the original intention was to form a society, similar in most respects to the Linnean and other learned societies, which were composed of men of kindred tastes, to hold periodical meetings at which papers were to be read and discussed, the papers eventually to be published in the Society's Transactions. That these objects were fulfilled may be seen from the Transactions of the Royal Horticultural Society from 1805 onwards. It would seem that holding big flower shows for the benefit of the public as well as the Fellows did not come within the scheme of the original founders. But it was in the course of a few years realized that something more remained to be done other than reading papers to a very limited audience. An institution which stands still, in effect retrogrades, and is almost its only mourner at its own funeral. And so in July 1827, after being established for twenty-two years, the Royal Horticultural Society held its first Exhibition at Chiswick; this was visited by nearly 3,000 persons. Other fêtes followed, but were mostly failures, owing partly to the weather; and in 1833 the Society's rooms in Regent Street were utilized for an exhibition. They were again transferred to Chiswick, and that of 1846 was said to have been attended by about 14,000 people.

In the interval the Royal Botanic Society was established in Regent's Park in 1838, under the patronage of the Duchess of Kent, the Duke of Sussex, and the Duke of Cambridge; the first Exhibition was held in May 1843, but the gardens themselves were only half completed, and the weather was not at all favourable. But the way of the pioneer is always beset with unexpected difficulties; the Royal Botanic Society held its own for nearly a century, but it outlived its usefulness and became somewhat of an anachronism, peacefully expiring some two or three years ago.

Flower shows, in the form of Floral Feasts, mostly in the provinces, existed some two centuries before the establishment of the Royal Horticultural Society. NATHANIEL RENCH of Fulham is said to have been the first to start them in London, "probably about the end of the seventeenth century" (Loudon's Encyclopaedia of Gardening, 1835, p. 1240); they certainly existed in various parts of the Metropolis and its suburbs in the eighteenth century. There were upwards of 200 horticultural societies to hold exhibitions when the Royal Horticultural Society held its first public show in 1827, but most of these societies were in the Midlands and were parochial in character. They were a kind of set-off to cock-fighting and other "sports" of anything but an elevating type.*

The establishment of the Royal Horticultural Society on a dignified and national basis was followed in the next few years by an epidemic of

^{*} Ireland was not behind in these matters. There is in existence the original MS. Minute Book of the Florists' Club in Dublin, with names of its members from its foundation in 1747 to its end in 1766. Apparently it was a dining club of those interested in flowers—possibly a kind of Florists' Feast.

horticultural societies in the provinces, and these, backed by the influence and support of local magnates, sounded the death knell of the "Florists Feasts" which were invariably held at the local public house. The names and activities of these local societies may be gathered from Loudon's Gardeners' Magazine and the Gardeners' Gazette (which began in January 1837). The history of the origin and development of horticultural societies would form an admirable subject for a thesis.

That these public exhibitions greatly contributed to the advancement of horticulture in all its branches will not admit of any doubt. From the scanty printed material which exists some of the local societies and their exhibitions were important—the Fourth Annual Report of the Royal Devon and Cornwall Botanical and Horticultural Society, 1834, is a substantial volume of over 100 pages—the King and Queen were patrons, and the Society had the active support of the nobility and gentry of the two counties; and in all cases there were prizes for the cottager as well as for the Squire.

The "epidemic" of horticultural societies was not confined to the provinces; it was no less prevalent in London and its suburbs. It is difficult to-day to realize the conditions which prevailed a century ago. What were then remote villages are now just parts of one leviathan whole. Each of these then well-defined districts had its own entity and its own social life, and was jealous of its own birthright. Gardening societies of various types came into existence in nearly every one of these outlying parishes; at Clapham, for instance, there was a Gardeners' Association for Mutual Improvement, at which papers were read and discussed, and some were printed in the Florist's Journal and possibly elsewhere. The Streatham Gardeners' Society (established in 1840) published its own papers—I have a volume which covers the years 1843–9—and formed a considerable library of botanical and other books for the use of its members.

I am afraid that these notes will seem a lengthy introduction to the primary purpose of this article; but I think they will be found desirable to those who are not familiar with the progress of horticulture during the first two or three decades of the last century.

So far as London is concerned the Royal Horticultural Society's most spectacular rival was the South London Floricultural Society—it became the Royal South London Floricultural Society in 1838—which had its origin and location in Lambeth; but its activities were not exclusively confined even to the vast area then and now denominated South London. It must be remembered that up to the middle of the last century, and even later, the whole of South London was a residential quarter, a few villages scattered here and there, but most of the land attached to the villas and mansions of wealthy citizens, the home farms and pleasure gardens often extending into many acres. A journey from any of the bridges to-day to Streatham or to Tooting, or to any other large centre south of the Thames, will show signs of these spacious residential days, which as such were ruined slowly but definitely by the railway and by the tram.

But a century ago the South London district was rural and prosperous, and the South London Floricultural Society was for years a great success. It is obvious that a society which could offer from 50 to 100 silver medals (and a few in gold) for flowers, fruit, and vegetables, on at least two if not three occasions in each year had very influential support. So far as my researches go. I have not found that any similar society in England offered such a series of prizes. And it is for that reason that no excuse is, I think, necessary for this paper. The essential materials for anything like an adequate history of nearly all these early societies are so scanty as to be of little practical use. By a stroke of good luck which sometimes occurs to the collector, a year or two ago I came into possession of a batch of printed matter, schedules of prizes, posters, and handbills entirely relating to the South London Floricultural Society, ranging in date from 1836 to 1843. How these ephemerides, mostly awkward in shape and unlovely specimens of the printing-press, came to escape destruction is a mystery; one of the documents—not directly connected with the Society—is addressed to Mr. Iliffe of Canterbury Row, Kennington, one of the Vice-Presidents and the Chairman of the Society, and it may be that all came from that source. It is perhaps sufficient to know that these things have, for a time at least, been saved from destruction.

The personnel of a society of this kind is important, for it helps to explain much that would not be otherwise understood. In 1836 and for many years the Earl STANHOPE was President, and the six Vice-Presidents were Lord Arden, John Allnutt, J. Bright, B. Hawes, M.P., W. T. ILIFFE, F.L.S. (Chairman), and J. F. Young, M.D.; in 1838 the Earl of RIPON was added, and in 1840 the Rev. J. F. STAIN-FORTH took the place of Lord ARDEN. As most of these names will convey little to many readers of to-day, it will, I think, be interesting to deal briefly with each one, and to indicate where possible how it happened that they became associated with the South London Floricultural Society. Earl STANHOPE (1781-1855), the fourth Earl, and Lord Arden (1756–1840) were doubtless nominated on account of their public eminence and the influence which their names would carry, but both may have had property in the south of London. Apart from this Earl Stanhope was President of the Medico-Botanical Society of London, 1829-37, and took more than an academic interest in horticulture; and Lord Arden's wife, Lady Margaret Elizabeth Arden, was a mycologist.

John Allnutt's position as a vice-president is easily accounted for: he was a South London resident, one of the many wealthy city merchants who lived at Clapham. His residence near Clapham Common is now partly covered by Elms Road; it occupied several acres and included a home farm. He was a distinguished patron of art, and his "very celebrated collection" of pictures was dispersed at Christie's, on June 18, 1863, and two following days, the total amounting to nearly £20,000. He was the head of a firm of wine and spirit merchants established in the city in 1770 and probably much

earlier, and is still in existence; he lent large sums of money to Sir T. LAWRENCE, who painted his portrait and those of his first and second wives. His grand-daughter married Thomas, afterwards Lord, Brassey, and wrote The Voyage of the Sunbeam, 1878, which enjoyed an immense popularity, running into twenty editions. Lawrence's portraits of John Allnutt and his first wife are still in Earl Brassey's possession. John Allnutt was a Fellow of the Royal Horticultural Society; at the meeting in July 1826 he exhibited a 'Providence' Pineapple from a plant eighteen months old, and in August a collection of double Dahlias and five sorts of grapes. He died at Clapham on January 12, 1863, his estate being valued at about £50,000, a large amount in those days. There are several references to the Allnutts in Farington's Diary.

The identity of the Treasurer, John Bright, Esq., is less clear, and I can only provisionally suggest that he may have been JOHN BRIGHT (1782-1870) for many years Physician to Westminster Hospital and a Metropolitan Commissioner in Lunacy; but in none of the printed schedules is his name accompanied with initials indicating any medical degree. The presence of Benjamin Hawes (1797-1862) among the vice-presidents was perhaps political rather than geographical; he was in fact Whig M.P. for Lambeth (1832-47), held various offices in the Government, and was knighted in 1856; he was in business as a soap manufacturer with his father and uncle and figures in Francis's Orators of the Age. WILLIAM TIFFIN ILIFFE (he died at Epsom in 1876), the Chairman of the Society, and probably one of its most enthusiastic members, was a medical man, of 19 Canterbury Row and 12 Foxley Road, both in Kennington; he was a Fellow of the Linnean and of other learned societies, Lecturer on Medical Botany at St. Thomas's Hospital, and a prolific contributor to the medical press. Loudon, in the Gardeners' Magazine of 1839 (p. 678), refers to him in high terms, and to the indebtedness which the South London Floricultural and other societies owed him. James Forbes Young (1796-1860), M.D., was another general practitioner, residing at 17 Kennington Place; he was a Fellow of the Linnean, Royal Botanical, and Zoological Societies, and helped Cooper in his Flora Metropolitana.

In 1840 a new name was, as already stated, added to the list of vice-presidents, that of the Rev. J. F. Stainforth. He was of Queens' College, Cambridge, where he took his B.A. degree in 1830, was ordained in 1834, was Rector of All Hallows Staining, London, 1851, was Curate of St. Pancras, 1850–60, and Assistant Preacher at the Temple in 1860–66. He does not appear to have had definite connexion with South London; but he must have taken a keen interest in the South London Floricultural Society, for in 1838 he offered a silver medal "open to all England" for the best specimen Dahlia. But his chief claim to fame is that he formed the largest library ever got together of books by women writers of all times and places, and that library was sold at Sotheby's, on July 1, 1867, and five following days. It is hardly necessary to state that, in its early stages at least, the

success or otherwise of a society largely rests with the Secretary. The Honorary Secretary of the South London Floricultural Society from 1836-40, and probably for years afterwards, was RICHARD HOWTON CUMING, of 3 Dean's Row, Walworth. Mr. Helliwell, the Chief Librarian of the Southwark Public Library and Curator of the Cuming Museum, Walworth Road, tells me that Dean's Row is no longer in existence; it stood almost opposite what is now the Central Library The Cumings appear to have been associated, probably and Museum. as property owners, with Walworth for considerably over a century, and the above-named Museum will preserve their name there in perpetuity. The founder, RICHARD CUMING, was born in Newington in 1777 and died at 63 Kennington Park Road, February 15, 1870, in his ninety-third year. He was probably one of the last surviving officers of the Volunteers of 1798; he was one of the first and probably one of the last surviving members of the old Entomological Society of London, founded in 1801 under the title of the Aurelian Society, and one of the members of the Lambeth Chemical Society founded in 1810 under the presidency of Anthony Carlisle; he translated the greater part of CUVIER'S Regne Animal to which EDWARD PIDGEON'S name is also attached. His son, HENRY SYER CUMING, F.S.A. (Scot.), was also a collector, and at his death in 1902 bequeathed the collection formed by his father and himself to his native borough of Southwark. The RICHARD HOWTON CUMING who acted as Honorary Secretary of the South London Floricultural Society was probably a son of the RICHARD CUMING whose collections founded the nucleus of what is now the Cuming Museum; so far I have failed to find any very definite biographical data concerning him.

From what has been stated it will be seen that the South London Floricultural Society was an entirely local enterprise. We know that it was in existence in 1836 and that it was presumably flourishing in 1853—I have the very fine silver medal (fig. 90B) (it weighs 3½ oz.) "Presented to JOSHUA CLARKE Esqre. F.L.S. for Thirty of the Rarest British Plants"—it was in January 1853 that Joshua CLARKE was elected F.L.S., and the award could not have been so inscribed earlier than that year. I have no information as to when the Society ceased to exist. Societies which so often start with a great flourish of trumpets just as often disappear without even the advantage of an epitaph. The decline and extinction of this Society must have been due to causes which nothing could avert. It was not so much the progress of the Royal Horticultural Society and the Royal Botanic Society as the entire change which was taking place over South London—the establishment of factories and industries, and the rapid increase in the working-class population; whilst the increase in the number of bridges across the Thames, the extension of local railways and the introduction of tramways all helped to destroy the sylvan and rural amenities of South London. The big estates,*

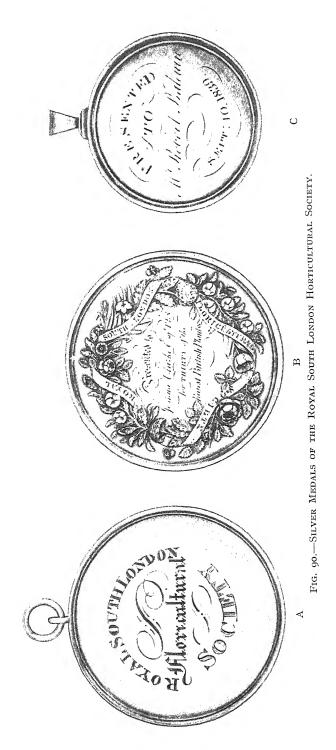
^{*} The Thrale estate at Streatham—now entirely covered with houses—so intimately associated with Dr. Johnson, extended to about 90 acres; and in May 1825 WILLIAM CUBITT bought Bleak Hall Farm, at Clapham, which consisted of over 229 acres.

with their home farms within a walk of an hour or so of the centre of the city, were cut up and covered with villas and cottages; whilst the residential value of these large places had declined, so far as the opulent merchant was concerned, their value for building purposes had vastly increased. In 1810 ROBERT THORNTON sold his land at Clapham at £500 an acre; forty years later probably ten times that amount would have been refused. The market gardens and the nurseries of Lambeth,* Walworth, Battersea, and the neighbouring parishes were crowded still further out into the country.

But there was another disintegrating force. Whilst the South London Floricultural Society was a separate entity, it seems to have been more or less of a side-line of the Royal Surrey Zoological Gardens, where its exhibitions were usually held. So long as success followed one so it affected the other. The Surrey Zoological Gardens, as such, existed from 1831 to 1855, and a fairly full history, with illustrations of the place in its various transformations, will be found in WALFORD'S Old and New London (vol. vi, pp. 265 et seq.). There were usually three horticultural shows each year, in June, in July, and in September. The schedules of these exhibitions are drawn up with a matter-of-fact dignity which leaves nothing to be desired; and it is only when the Surrey Zoological Society announced these exhibitions in conjunction with its own attractions that the big drum is beaten with no uncertain sound. The gentleman who each year drew up the "copy" for the wonderful posters was not hampered by restraint or accuracy, and his shortcomings, if any, were more than fully made up by the printer, whose display of varied type, mostly large, renders these posters almost masterpieces in their way—certainly in horticultural annals. What the visitor got for his shilling is amazing. The Menagerie and the Flower Show were included of course; in 1839 there was also Mr. H. CARTER'S new and extraordinary Koniaphostic, an "amazing spectacle which portrayed with the utmost fidelity the terrific details of an eruption of the famous burning mountain of Iceland, Mount Hecla "-this came on at dusk and the whole of the gardens were "illuminated by one central light." There were also an instrumental concert and a "grand promenade musicale." Very few indeed could have left the Gardens feeling that they had not had a good shillings-

An adequate idea of the comprehensiveness of these exhibitions can only be gathered by examining the various schedules, but only one can be quoted *in extenso* here. In spite of its length it cannot fail to be of historical interest to-day. The following is the schedule for the "Grand Miscellaneous Flower Show" of Tuesday, June 14, 1836:

^{*} Lambeth, apart from the Tradescants, was famous for its florists a century earlier than the South London Floricultural Society. We read in the Gentleman's Magazine, in 1738, of "William Smith, Esqr., a curious Florist," of South Lambeth; 1739, of the death at Lambeth of Mr. Dennet, "an eminent florist"; in the London Magazine, 1743, of Mr. Kingman, Master of the Artichoke Alehouse, "the most eminent Florist in England"; and in 1791 of J. Thomas James, Esq., nurseryman of Cuper's Bridge, a J.P., and Sheriff of Surrey in 1774.



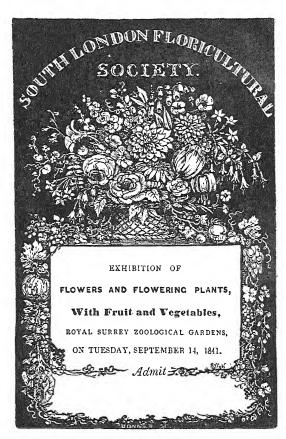


Fig. 91.—Exhibition Admission Ticket, 1841.

CLASS THE FIRST.

	Nurserymen.										
ı.	For the best collection of Miscellaneous Plants, not to	exceed	Medals.								
	50 pots		Large								
2.	For the second best ditto		Middle								
3.	For the third best ditto		Small								
4.	For the best collection of Geraniums, in 18 vars.		Large								
5.	For the second best ditto		Small								
õ.	For Rhododendrons, in collections of 6 pots		Middle								
7.	For Azaleas, in collections of 6 pots		Middle								
8.	For Calceolarias, in collections of 12 pots		Middle								
	For Roses, in collections of 50 vars., in trusses of one stem		Middle								
	For second best ditto		Small								
Ι.	For Heartsease, in stands of roo vars		Middle								
	For the best collection of Cut Flowers		Middle								

Entrance to Non-Members, 3s. 6d.

CLASS THE SECOND.

Gentlemen's Gardeners, entering in their own names.

I.	For the best	collection	of M	iscell	aneous	s Plan	nts, :	not to	exce	ed	
	36 pots										Large
2.	For the second	d best ditte)								Middle
3.	For the third	best ditto									Small
4.	For Geranium	s. in collect	tions	of 12	variet	ies					Middle
	For Calceolari										Middle
	For Roses, in					usses	of on	e stem			Middle
	For the second										Small
	For Pinks, in			varie	ties	-			_		Middle
	For Ranuncul					ties	Ĭ.			Ĭ	Middle
	For Heartseas						•	•	•	•	Middle
						•	•	•	•	•	
II.	For the best c	ollection of	Cut	Flow(ers			•			Middle
12.	For the second	l best ditto)								Small

Entrance to Non-Members, 2s. 6d.

CLASS THE THIRD.

Amateurs (Members only).

Ι.	For	the	best	collecti	on o	f M	liscella	neous	Pla	nts,	not	to	exce	ed	
		pot													Large
2.	For	the s	secono	l best d	itto										Middle
				best dit										•	Small
4.	For	Rose	es, in	collectio	ons of	813	vars.,	in tr	ısses	of o	ne st	em	•		Middle
5.	For	the s	secono	l best d	itto										Small
6.	For	the t	hird	best dit	to.			-					•		Small
7.	For	Pink	s, in	collectio	ns of	12	variet	ies					•	•	Middle
8.	For	the s	secono	l best d	itto									•	Small
9.	For	Ran	uncul	us, in co	ollect	ions	of 12	varie	ties						Middle
				i best d									•		Small
II.	For	Hea:	rtseas	e, in sta	ınds (of 2.	4 varie	eties						•	Middle
2.	For	the s	secon	l best d	itto		-								Small
				best dit											Small
				ollection											Middle
				ollection					ardy		•		•	•	Small
6.	For	Tuli	ps, in	collecti	ons o	f 12	varie	ties					•	•	Middle
7.	For	the s	secon	i best d	itto		•		•		•		-	•	Small
	VOL	. t.tx													R

Open	TO A	LL C	LASSES	;.				Silver Medals.		
 For the best Specimen Plant For the second best ditto For the third best ditto For Orchidaceous plants in flot For the second best ditto For the best seedling specime grower 					sorts		the	Large Middle Small Large Middle		
Entrance t	o No	n-Me	mbers,	, 2s. 6	5d.					
 For the best Pineapple For the best Queen Pine For the best Dish of Strawber For the best Bunch of Grapes For the best Dish of Fruit 	ries	ruit. • • •	· · ·				· · ·	Middle Small Small Middle Small		
Vegetables.										
 For the best 6 sorts of Vegeta For the second best ditto 	•	•	•	:		:	:	Middle Small		
Entrance t	to No	n-Me	mbers	, 2s. (5d.					

There were three grades of silver medals, the large, the middle, and the small. One of the conditions was that "No award will be made by the Censors in cases where the objects exhibited do not appear worthy of a Prize," and another was "Exhibitors will be required to sign a declaration that the specimens they exhibit are bona fide their own property, and have been in their possession at least two months."

The schedule as a whole seems to have remained pretty much the same all the time, with variations according to the time of the different exhibitions. In July 1837 Ericas, Cockscombs, and Balsams were included; Dr. Young and Mr. Bright offered extra prizes of silver medals for the best 24 blooms of Picotees, and for the best collection of Roses, not less than 18 varieties; whilst Mr. W. Christy, Jr.,* offered a prize for the best British Herbarium, and another one in the form of books for the best Herbarium of exotic cultivated specimens. formed by any gardener, apprentice or journeyman, between April 20, 1837, and the First Flower Show in 1838. As time went on other special prizes were offered by Mr. FAIRBAIRN, by the Rev. J. F. STAINFORTH, by Dr. Young, by Mr. Denyer (for the best 12 Pelargoniums in 1839). by T. BARNARD, Esq. (for the best stands of 12 white ground Picotees, 1839); two by Dr. Young (for the best collections of flowers and fruit "modelled in wax by the Exhibitor," 1839); by Mr. WIDNALL (for the best single bloom of any yellow Dahlia, 1840); and by W. T. ILIFFE, Esq. (for the best 24 succulents, 1840). On July 27, 1841, two silver cups and eight other prizes were offered for five different classes of Picotees, and the Linnean Medal for the best collection of 24 cut

^{*} WILLIAM CHRISTY, F.L.S. (1807-1839), was of Lambeth and Clapham and resided at Stockwell, and was a man of high accomplishments; LOUDON wrote a graceful and charming notice of him in the Gardeners' Magazine, Sept. 1839, p. 536.

The Last Flower Show of the Season.

Under Her MAJESTY's immediate PATRONAGE.

ROYAL ZOOLOGICAL GARDENS,

On TUESDAY next, Sept. 11, 1838,

THE ROYAL

SOUTH LONDON FLORICULTURAL SOCIETY

Will hold their Grand Autumnal

FETE DES FLEURS AND

DAHLIA SHOW!

And award Prizes for the best Specimens and Collections of Dahlias, Asters, Balsams, Roses, Hearts-Ease, Cockscombs. Orchideous, and Specimen Plants, Miscellaneous Collections, Cut Flowers, Fruits, Vegetables, &c. &c.

Some idea of the extraordinary exertions which have been made to render this Last Show one of unequalled splendour, may be formed from the fact that under one magnificent tent alone, will be displayed upwards of

1,200,000 DAHLIAS,

Besides Collections in various other parts of the Cardens.

NEW MILTERY BAND

Of Thirty Performers, under the Direction of Mr. Martin, formed expressly for this Establishment, and decidedly superior to any other of the same numbers in the Metropolis, will perform (for the first time in public) the following popular Overtures and Selections,

Fra Diavolo, Walch's March, Mountain Sylph, I Puritani, March from Norma, Spanish Chaunt, Hommage a la Reine de la Grand Bretagne, Artillery Quick March, Gustavus III., Pot Pourri, Glittering Sword, Brass Valse, Lestocq, Elizabethan Valse, Keichvoie Valse, Tam O'Shanter, &c.

THE VAST PANORAMA AL FRESCO OF

Mount Vesuvius

THE BAY OF NAPLES, MONT SOMNA, & POSILIPO, Will be seen during the day, succeeded by the terrific representation of an

ERUPTION !

Which has been rendered more grand and imposing by the recent introduction of many new incidents.

Admission One Shilling.

Gates Open at 1. The Flowers will remain till 7. Eruption 4past 8.

J. King, Printer, College Hill.

indigeneous plants in flower. Gold medals, three in number, appear for the first time in 1840. I have specimens of what appear to be the middle and the small silver medals—there is the slightest possible difference in the weights—one awarded to Mr. Robert Baldwin, September 10, 1839, and the other to Mary Ann Baldwin, September 15, 1840, but there is nothing to indicate what they were awarded for (fig. 90 A, C).

Whilst nothing was left undone to make each of the three exhibitions a popular success, the September shows seem to have been those on which the Zoological Committee concentrated most of its energies in the way of posters, and at these the Dahlia was the "star lot." The posters and the handbills assure us that at the show of September II, 1838 (p. 245), over 1,200,000 Dahlias were to be on view; the show must indeed have been "one of unequalled splendour . . . under one magnificent tent alone." Of the 71 prizes (of which three were in gold) 30 were for Dahlias. As the exhibits had to be in the gardens at g o'clock and had to remain there till 7 p.m. it would be interesting to know how they were counted! Reports, mostly brief, of some of the exhibitions were published in the few gardening periodicals published at the time, e.g. Loudon's Gardeners' Magazine, and The Gardeners' Gazette; Mr. E. K. SWANN of Wheldon & Wesley, the well-known botanical booksellers, has kindly pointed out to me that the Florist's Journal, 1840-48, gives an account of the various shows and proceedings of the Society.

One gleans from the posters a few interesting facts couched in phrases a little too flowery to be the unaided effort of the South London Floricultural Society. It may be noted, to begin with, that these Exhibitions were "Under Her Majesty's immediate Patronage." In 1839 we are told that "The unusual number and value of the Prizes have stimulated the exertions of Exhibitors to the utmost, and the consequence has been the entry of a list of names as competitors in the respective classes, quite unparalleled in the history of English Floriculture." Again (Sept. 14, 1841) we are assured:

"The South London Floricultural Society having been recently honoured with the august patronage of the Royal Family and several other noble and influential patrons of Floriculture, the Committee are using the utmost exertions to prove the Society worthy of the high honour thus conferred, by endeavouring to render the forthcoming Exhibition at the Gardens one of unexampled magnitude and splendour. To this end they invite the co-operation of Nurserymen, Florists and Amateurs interested in the culture of the Dahlia or the other Floral products of the Season for which prizes of 73 gold and silver medals will be distributed."

Then again (June 14, 1842): "Besides the Exhibition of Floral and Horticultural products which from the fineness of the Season and other favouring circumstances is confidently expected to be unusually rich, varied and extensive, the whole of the popular entertainments for which this Establishment is so widely celebrated, will be given on a scale of grandeur eclipsing all previous efforts." Judging from the poster, things got more lyrical than ever in 1843 (June 13) when 70 gold and silver medals with various extra prizes were awarded to

Under the especial Patronage of HER MAJESTY.

Royal Surrey Zoological Gardens

THE FIRST

FLOWER SHOW

SEASON.

OF THE TUESDAY

JUNE 14.

The Royal South London Floricultural Society

GRAND FETE DES FLEURS.

IN THE ABOVE ADMIRABLY ADAPTED GROUNDS,

On TUESDAY, JUNE 14th, 1842. WHEN

SIXTY-FOUR GOLD & SILVER MEDALS

In addition to the Prizes given by the Committee, Extra Prizes are offered by Members of the Society.

By Mr. Catleuoß, to Amateurs for the best collection of Felargoniums..... A Large Silver Medal. By W. Davis, esq. to Nurserymen, for ditto ditto..... A Large Silver Medal. By Mr. Davis, esq. to Nurserymen, for ditto ditto..... A Large Silver Medal. By Mr. Davis, to Sandard Silver Medal. By Mr. Daviza, to Gentlemen's Gardeners for the best collection of Cut Flowers A small Silver Medal.

The Flowers will be arranged in Classes under the spacious and handsome Tents of Messrs. Staff & Son.

Besides the Exhibition of Floral and Horticultural products, which from the fineness of the Season and other favoring circumstances, is confidently expected to be unusually rich, varued, and extensive, the whole of the popular Entertainments for which this Establishment is so widely celebrated, will be given on a scale of grandeur eclipsing all previous efforts.

THE CELEBRATED AND UNEQUALLED MENAGERIE,

With all its recent additions, and the Colossal Typorama or Modelled

VIEW OF ROME!

Entirely re-produced by Danson, the original Artist, will be exhibited throughout the Day. A FULL MILITARY BAND

Will be in attendance until Six o'clock, when the Unrivalled Band of Wind Instruments, conducted by Mr. Godraft, will perform a CONCERT CHAMPETRE,

The Programme of which will include, among other attractive features,
A Sinfonia by Beethoven; The Grand Fantasie Concertante on "Gustavus;"
The new Overture, "Du Colporteur," An entirely new Fantasia on Themes
from "Les Hugenors" (arranged by Godfrey, for this occasion); New
Waltzes and Quadrilles; and a Selection from the favourite airs of "Acis and
Galatea" (arranged by W. Hardy, for this occasion), with Solos and Variations for all the principal Performers.

At Dusk will commence the extraordinary Fac-simile of the

ILLUMINATION of the CATHEDRAL

St. PETER at ROME! GIRANDOLA

Fireworks of Angelo.

In which Mr. SOUTBBY, the unequalled Pyrotechnist, will introduce several new and appropriate incidents of surpassing magnificence.

ADMISSION ONE SHILLING.

Gates open at 1. Concert at 6. Fireworks at \(\frac{1}{2}\)-past 9.

amateurs, nurserymen, florists, gentlemen's gardeners and market gardeners, and the "Flowers will be arranged in splendid Pavilions and Marquees dispersed in various parts of the Grounds." The side-shows included five beautiful giraffes which were to be seen "in their Egyptian Hut, attended by their Nubian and Abyssinian Keepers," and in addition to Mr. Godfrey's "unrivalled band of wind instruments" there was "Danson's New, Stupendous, Panoramic Model al-fresco of the sacred excavated Temples of Elora; at dusk, the celebration of the Rites of Boodha, on the occasion of a Burrah-Tamasha or Grand Hindoo Festival in which will be introduced all the extraordinary splendours and indescribable effects of Nubian Pyrotechny."

I think that this may have been a sort of Swan Song of the combined efforts of the Royal South London Floricultural Society and the Royal Surrey Zoological Gardens. The only document I have of the year 1844 is a small and wretchedly printed handbill of the last floral fête of the Season (Sept. 17) at which there was a grand Dahlia and miscellaneous Show for Flowers, Fruit, and Vegetables, but there is no mention of the Royal South London Floricultural Society; it may be that that Society had found the environment of the Surrey Zoological Gardens a trifle too spectacular for its exhibitions. It is difficult to harmonize a "superb menagerie," the "feeding of the carnivora," pyrotechnic and other displays with flower shows of any sort; and any horticultural society which depends on such extraneous support is bound to come to grief.

My notes, based on the flotsam and jetsam of the printing-press, can only be regarded as what the French call "Mémoires pour servir" towards a full history of the Royal South London Floricultural Society, should such ever be undertaken. The Society, like nearly all its contemporaries, has long since become merely a name, and scarcely even that. It did good work in its day and in its way; and the successful horticultural societies of the twentieth century owe a very considerable debt of gratitude to the pioneers of a century ago, one of which was the Royal South London Floricultural Society.

THE LACE-BARK PINE OF CHINA (Pinus Bungeana Zuccarini).

By W. Dallimore, V.M.H.

IN 1932 Mr. M. E. Weatherall of La Melade, St. Martin's, Guernsey, who had long been resident in China, called at Kew and gave some very interesting information about this rare Pine, at the same time promising to send photographs of the tree growing in China to Kew. These photographs arrived late in 1933, and by the kindness of Mr. Weatherall and the Director of the Royal Botanic Gardens, Kew, we are able to publish one of them (fig. 94), together with Mr. Weatherall's notes on the species.

Writing to Kew, Mr. Weatherall says: "Pinus Bungeana occurs in N. China, but I have never seen one growing naturally. It is said that there is a forest of these trees in Shansi, but I have never met anyone who has seen them. Curiously enough, I have never come across any reference to these remarkable trees by any foreign writer before William Fortune, a trained man.

"The Chinese plant this tree (a) in temples, always in pairs, one on either side of the main hall, and perhaps in other courtyards; (b) immediately behind, and in an arc around, the tumulus of a high official or Manchu noble or Imperial clansman; and (c) as decoration in tomb enclosures of these classes. Doubtless from their occurring so often in tombs of the late dynasty, a superstition has grown up that to thrive they must be planted on a dead Manchu.

"The tree is exceedingly difficult to rear, and is usually bought under a guarantee that if it be not alive at the end of two years, the buyer gets his money back. Once these two years are passed the tree is very hardy though exceedingly slow in growth.

"It flourishes in thin rocky soil, where the rain can drain away quickly. It will stand IIO° shade heat, and o° in winter, and endures the bitter N.E. gales of January and February in Peking.

"When not interfered with it grows with a straight trunk, but the Chinese commonly wire the young tree so that instead of one trunk it has several. It is pale olive green until it is about seventy years old, when it turns snow white. It is easy to ascertain the age of many of these trees from the tomb inscriptions, and I am of opinion that their life rarely exceeds 400 years. At about 250 the tree is in its prime, and then a gradual decay sets in. The dying limbs are jet black, and form a striking contrast with the white branches around them. The wood is of no value.

"The rainfall of Peking is as follows: Less than I inch falls in January, February, March, April, October, November and December: 1.66 in May, 3.53 in June, 9.53 in July, 5.99 in August, and 2.87 in

September. Owing to the complete deforestation of the surrounding country, the climate of Peking is excessively dry. It would, therefore, appear difficult to find in England any situation at all resembling for drought and inclemency that in which the tree flourishes in N. China."

P. Bungeana grows very slowly in the British Isles, and good examples are rare. The best trees recorded for the Conifer Conference in 1931 were, one at Patshull House, Staffordshire, 41 feet high, and one at Kew 33 feet high. In each place there are other trees almost as large, but they have grown slowly in comparison with other Pines. When young there is a decided tendency for growth to take place in bush rather than in tree form, and the bushy habit is difficult to correct. This is unfortunate, for it is a most interesting species, quite distinct from any other Pine by the way in which it sheds its bark in small plates revealing young green bark beneath—a peculiarity that can only be fully appreciated when the lower part of the trunk is clear of branches. Up to the present time the bark of the trees at Kew has not taken on the characteristic white colour of old trees, but they must be fast approaching the seventy years period described by Mr. Weatherall.

The species was originally discovered by Dr. Bunge near Peking in 1831, and the original description was made from specimens taken from cultivated plants. Wilson, however, found it growing wild on the mountains of Hupeh in November 1907 and in January 1909, for, writing of this species in Plantae Wilsonianae, vol. ii. p. 14, he says: "This Pine, though frequently met with as a planted tree in temple grounds and courtyards in north-eastern China, is very rare in a wild state. It is only known to me from two districts in western Hupeh. where it occurs on escarpments of mud-shales. It grows 5 to 20 m. tall, and commonly the trunk divides a few feet above the ground into several stems. The habit is pyramidal, often somewhat irregular, and in old trees occasionally round-headed. On old trees the bark on the trunk, on the main branches and exposed main roots is milk white and exfoliates in flakes of irregular contour. The wood is brittle and of no value except as fuel. With its white bark, massive trunk, stout. deep green leaves this tree is highly ornamental and is so esteemed by the Chinese whose name for it is Peh Sung (White Pine)."

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

LXXII.—Soil Experiments at Wisley.

The Influence of Soil Factors upon the Growth of Certain Vegetables.

By (the late) F. V. DARBISHIRE, Ph.D., and M. A. H. TINCKER, D.Sc.

EVERY gardener realizes that the yield obtained from any given variety of vegetable fluctuates according to the conditions under which the plants are grown; these conditions are arbitrarily divisible into two groups—climatic and soil. It is obvious that these factors are not independent in action; for example, the influence of rainfall depends partly upon the physical properties of the soil, for drainage may be slow in a clay and quite rapid in a sandy soil. Such relationships between factors of the environment make it no easy matter to ascertain with accuracy the mode of operation of any factor held responsible for observed fluctuations in growth and yield, at various localities in different seasons.

In attempting an analysis of the influence of the environmental conditions one very good method, particularly suitable for a laboratory investigation of a few plants, is to keep all the factors but one constant, and to vary that one factor and observe its effect. The valuable information so acquired may, however, not be directly applicable to gardens where many factors vary simultaneously. For this and for other reasons it seemed desirable that information should be gathered upon the influence of soil factors on the growth of some common garden plants under uniform climatic conditions.

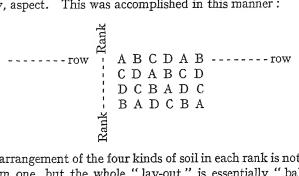
THE SOILS AND THEIR CHARACTERISTICS.

For this purpose, in 1928, four soils were collected at Wisley:

- (A) a heavy London clay, obtained from Stoughton, Guildford.
- (B) a loam soil rich in fibre, from Bramley (old pasture).
- (C) a chalky soil from Horsley.
- (D) a sandy soil—Bagshot sands.

These soils were placed in specially constructed pits lined with bricks laid in cement mortar. Twenty-four pits, each 20 feet \times 10 feet \times 3 feet, were prepared, each pit holding about 20 tons of soil. The bottom of each pit was formed by the natural gravel subsoil, ensuring good drainage below each soil. In order to follow this sloping gravel formation the pits were made in a terrace fashion, with a step of 3 inches between rows.

An arrangement of the soils was necessary so that no particular soil would be favoured in any way, as, for example, by a more exposed, or sunny, aspect. This was accomplished in this manner:



The arrangement of the four kinds of soil in each rank is not strictly a random one, but the whole "lay-out" is essentially "balanced," and any four adjoining ranks form a 4×4 scheme.

THE SOIL SAMPLES.

The methods of soil analysis followed those of the Agricultural Educational Association. All chemical analyses were made upon repeated (at least 5) samples from each soil pit, so that the figures presented represent the average of at least 30 determinations. For this reason relatively small differences may be of significance.

From time to time other methods, such as the rapid methods of Bouyoucos and Hardy, for moisture and other determinations, were tested and the results so obtained compared with those from orthodox procedure. It has not been considered necessary to present here all the data so collected, since many would interest only a limited number of readers.

FEATURES OF THE SOILS.

The high proportion of sand and fine sand present in the clay sample A was unexpected. The proportion of fine silt and clay was disappointingly low, as the original trial samples had given a much higher proportion of the finer components. Compared with the analyses of Hall and Russell, the percentages of silt and clay are so small that the sample was not truly representative London clay, but rather a sandy clay.

In soil B, loam, the percentages of the sand, silts and clay are more nearly equal. The soil therefore forms a strong contrast with D, in which a high percentage of sand was found. Another interesting feature of this soil was the high percentage of organic matter present.

In the chalky soil some 35 per cent. was pure carbonate, the rest was chiefly sand. The figures obtained on analysis are somewhat similar to those given by HALL and RUSSELL of a chalk from Fetcham, a locality near that from which this sample C was obtained.

Soil D is a typical example of the Bagshot sands, and represents the lower strata.

The soils are characterized thus:

A-sand with clay silt, no chalk.

B—loam rich in organic matter, no chalk.

C-chalk, no fine particles.

D-sand, with no chalk and very little silt or clay.

The proportions of the various constituents present are shown in fig. 92.

Determinations of the nitrogen, phosphate, and potash content of the soils were carried out, and the average results are shown in fig. 93. The loam (soil B) contained the greatest amount of nitrogen, more than twice that of the clay (A) and sand (D), and three times that of

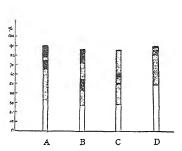


Fig. 92.—Mechanical Analyses of Soils, 1931.

A, Clay. B, Loam. C, Chalk. D, Sand.

The portions are, reading from the bottom: Coarse Sand, Fine Sand, Silt, Fine Silt, Clay, and (in C) Carbonates.

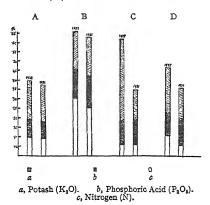


Fig. 93.—Chemical Analyses of Airdried Soils in 1928 and 1931.

A, Clay. B, Loam. C, Chalk. D, Sand.

the chalk (C). All of this organic and inorganic nitrogen was not readily available for the plant. The percentage of nitrogen in the clay and sandy soil (A) was not abnormal for such soils; in the chalk (C) also the amount of nitrogen was normal, and similar determinations have been reported from London clay and Kent chalk formations. The low percentage of phosphate found in the Guildford districts of the London clay is characteristic of such soils (see Hall and Russell figures). The other three soils were apparently fairly rich in phosphates. The potash content of the chalk soil (C) was higher than that of the other three soils, but the chalk soil was not abnormal in this respect—larger quantities of potassium have been reported in a number of chalk soils in the south of England.

Further samples were taken for analysis $2\frac{1}{2}$ years later. The loam soil (B) had become more consolidated, and in consequence the level of the soil was approximately 6 inches below that of the others. The analyses are shown in Table II. The analyses generally are in close agreement with those made at the earlier date. Nitrogen decreased slightly in all four soils, the greatest proportional loss occurring on

TABLE I. Showing Outline of Analyses of Soils; sampled September 20, 1928. Air-dried samples. Average figures for six pits, five borings from each pit to 9 inches deep.

		A. Clay.	B. Loam.	C. Chalk.	D. Sand.
Moisture Loss on ignition		2·090 4·120 0·096	3·780 11·200 0·309	0·930 — 0·063	0·830 2·38 0·106
Phosphates		0·084 0·018	0·145 0·021	0·006	0·121 0·052
Potash Available K ₂ O (1% citric)	:	0.017	0·205 0·008	0.451	0.244
Carbonates	•	34·148 34·750	19·804 14·395	34·765 31·290 20·571	47·920 32·220
Silt		9.226	16.880 12.270	6·449 1·462	5·940 2·183
Clay Loss on solution	:	0.301	14·260 2·298	1·920 1·908	1.800
Stones and gravel .	•	9.19			

TABLE II. Showing Nitrogen and Potash Changes in the Soils.

			A. Clay.	B. Loam.	C. Chalk.	D. Sand.
Nitrogen (1928) .			0.096	0.309	0.063	0.106
Nitrogen (1931) .			0.085	0.259	0.058	0.063
Percentage decrease			11.500	16.100	8.000	40.500
1928, K ₂ O			0.218	0.205	0.451	0.244
available			0.017	0.008	0.006	0.000
1931, K ₂ O .			0.101	0.204	0.151	0.165
available	•	.	0.012	0.008	0.006	0.008

TABLE III.

Showing Outline of Analyses of Soils; sampled April 1931. Air-dried samples. Average figures for six pits, five borings from each pit to 9 inches deep.

			A. Clay.	B. Loam.	C. Chalk.	D. Sand.
Moisture	•		1.960	3.080	0.605	1.230
Loss on ignition .			1·580	10.940		1.003
Nitrogen		1	0.085	0.259	0.058	0.063
Tilliogen	•	}	千0.0018	±0.006	土0.002	土0.002
Phosphates		- 1	0.097	0.166	0.141	0.143
-		l	千0.001	土0.003	+0.001	±0.002
Available P2O5 (19	% citric)		0.018	0.0206	0.006	0.052
Potash	•		0.131	.0 • 204	0.121	0.165
Available K2O (19	citric)		0.017	0.008	0.006	0.008
Carbonates					35.666	
Coarse sand			32.420	28.960	29.010	51.333
Fine sand			32.060	14.700	20.954	26.700
Silt			9.760	12-400	1.400	5.450
Fine silt			4.608	17.500	6.480	2.984
Clay			9.690	16.010	1.620	1.966
Loss on solution .			1.238	1.778	1.229	0.391
Stones and gravel	•		6.060	2.630	7.530	14.980

the sandy soil; the chalk soil, originally poor in nitrogen, suffered the lowest proportional loss. The phosphates did not seriously decrease; the available phosphates also were as recorded in the earlier analyses. The only large difference occurs on the chalk soils, where potash seems to have been lost. There was no corresponding difference, however, shown by the figures of the *available* potash, so that there is some doubt as to the reality of this difference.

TEMPERATURE RELATIONSHIPS.

Severe frosts in March 1929 froze the surface layers of the soils, and in each pit sections were cut and the depth to which the soil was frozen was measured. The sand froze to the greatest and the chalk to the least depth. Ice was visible between the soil particles in the loam only. When sunshine fell on all the soils measurements were made of the depth to which the soils thawed by noon; the chalk and sandy clay thawed more rapidly than did the loam. The temperature of the loam soil, measured at a depth of 6 cm., rose more slowly than that of the sand and sandy clay; in the chalk the temperature rose almost as quickly as in the sand. No doubt the high moisture content of the loam was at least partly responsible for the slow rise of temperature; this also kept the soil cooler in summer. Selected data are shown in Table IV.

TABLE IV.
Showing Temperatures of Soils.

Bags	hot Sand, Wi	isley.	6/5/29	8/5 Ave		IO/5/29 Tempera-	ro/7/32 Tempera-
Date.	Grass Minimum.	ı ft. Deep.	Average Dept Frozen Soil.		pth ture 6 cm. wed below Sur-	ture 6 cm.	below Sur-
1/3/29 2/3/29 3/3/29 4/3/29 5/3/29	° F. 8·0 8·0 9·6 20·1 12·0	° F. 34·0 33·9 33·9 33·9 33·9	B Loam 22 C Chalk 18	.50 4. .25 1. .75 5.	75 49·0 90 46·0 20 48·3	°F. 49·2 47·1 47·0 49·3	°F. 68·0 65·3 68·4 68·4

SOIL MOISTURE RELATIONSHIPS.

Periodically estimations of the total water in the soils were made by the usual methods; other methods were also tested, including those of Hardy, the soil point method, and of Bouyoucos,* the alcohol hydrometric method. The results of these tests are not presented in this paper.

The great discrepancy observed between the ratios, chemically determined, of the actual water present in two soils and that found to be taken up by carbon rods or pencils showed that the soil point

^{*} For criticisms of Bouyoucos' methods, see KEEN and JOSEPH.

measurements gave no measure of the *total* water present. Further determinations made by displacing the water also showed that the soil point method did not give an accurate measurement of the *readily displaceable* water in two soils.

The chemical determinations of the total water present showed that in early spring the loam contained more water than the other soils; the sand and chalk were relatively dry. Estimations made in summer showed that the loam soil retained the water well, both in the surface layer and at 9 inches. The surface layers of the sand dried to a depth of 6 inches, the clay to 2·5 inches, and the chalk to 3 inches. Only in the loam soil did an adequate supply of moisture remain in the surface for shallow-rooted plants.

Determinations of the moisture content were made 48 hours after an exceptionally heavy autumnal rainfall totalling over 4 inches in 10 days. The extremely high water content of the loam soil showed that percolation had been slow; on all the other soils percolation had been fairly rapid and the soils were not saturated.

The water-retaining capacity of the soils was tested by other simple experiments. Powdered samples of soil were spread out in the laboratory and dried for prolonged periods at 22° C.: whereas the sand, chalk and clay soil dried out almost completely, the organic matter and fine particles in the loam retained more moisture. Selected data are shown from various moisture estimations in Table V.

TABLE V.
Showing Selected Data of Moisture Determinations.

Date.	Depth Sampled.	Soil.	Percentage of Moisture.	Notes.
18/3/29	To 9 in.	Clay A Loam B Chalk C Sand D	15·1 29·7 11·4 12·3	Frost and thaw No rain
3/12/30	To 3 in.	Clay A Loam B Chalk C Sand D	12·55 31·34 17·00 13·3	After 4 in. rain
7/7/30	2 in.	Clay A Loam B Chalk C Sand D	3·3 ² 8·3 ² 2·55 2·20	After dry weather
7/7/30	To 9 in.	Clay A Loam B Chalk C Sand D	5·23 15·32 3·43 1·86	After dry weather
11/8/31	To 9 in.	Clay A Loam B Chalk C Sand D	1.96 ± 0.15 3.08 ± 0.24 0.605 ± 0.06 1.23 ± 0.14	Lab. air dried at 22° C.

	Table VI.			
Showing	Organic Matter—average percentage	loss	on	ignition.

Soil.		1 929.	December 1930.	April 1931.
Clay	A	4·12	3·38	1.58 ± 0.06
Loam	B	11·20	8·16	5.94 ± 0.12
Chalk	C	(12·80)	(8·50)	(7.45) due to carbonates
Sand	D	2·38	3·87	1.00 ± 0.03

ORGANIC MATTER.

Table VI shows the average percentage loss on ignition of ovendried samples of soil, and this loss represents, except in the chalk soils, the loss due to the organic matter so ignited. There was no appreciable amount of carbonates present in the clay, loam or sand. The organic matter in the loam soil gradually decreased from II to 6 per cent. in three years, owing to surface tillage allowing bacterial and other oxidation processes to proceed. A decrease of from 4 per cent. to I · 6 per cent. occurred in the clay soil, and from 2 · 4 to I per cent. in the sand. These, like other determinations, were made on the surface soil sampled to a depth of 9 inches.

HYDROGEN ION CONCENTRATION.

The hydrogen ion concentration was determined on 5 samples from each pit, so that 30 determinations were made of each soil. The methods employed were:

- (1) Quinhydrone determination, electrically, of soil solution and suspension.
- (2) Comparator colorimetric tests.
- (3) Soil tests with Universal and other indicators.

Average readings are shown, and may be assumed to be accurate to about o 1 of a unit, allowing for errors of sampling and technique.

1929. Soil suspensions: 4 inches depth of soil.

			$p^{\mathbf{H}}$
A. Clay .			7.2
B. Loam			6.7
C. Chalk			7.4
D. Sand			70

All the soils gave almost a neutral reaction at the beginning of the experiment except the loam, which was only slightly acid in reaction.

CULTURAL OPERATIONS.

(a) Seed-sowing.—The surface of the soil was forked, raked, and a fairly fine tilth obtained. This was not obtained in the chalky soil so

easily, but without exception germination in this soil was good. The seeds were counted or weighed to ensure equal sowing. Thinning followed ordinary garden practice, as did the date of sowing as far as was practicable.

- (b) Weeding, etc.—Weeds were removed by forking and hand-weeding. Characteristic flora appeared on the various soils indicative of their origin. No persistent and particularly troublesome weeds were encountered.
- (c) No artificial watering was given even in the driest periods, but in very dry weather the surface of the soils was lightly forked to prevent cracking.
- (d) No rolling or treading in of seedlings loosened by frost or soillifting was permitted, so that higher rates of winter killing than were unavoidable were observed.
- (e) Removal of Crops.—As far as possible all the roots of the plants were removed by deep forking of the ground after the estimation of each crop. As the data show, little humus accumulated in the soils from the plants.

GROWTH ESTIMATIONS.

Annual crops were grown in the soils in drills. Growth was estimated by observation, measurements of height, of foliage and of other parts of the plants. Yield was estimated by fresh and dry weights of the parts of horticultural value. Representative samples were taken and prepared for chemical analyses. The occurrence of pests and diseases was noted. The crop yield has been analysed upon a per plant basis, and upon a basis of the yield per row (of 20 feet).

The variation observed between the replications of the soils has been subject to statistical analysis, the method employed being Fisher's method of analysis of variance. Other tests also have been carried out, such as the χ^2 test for independence, using the index of dispersion. Conclusions have been drawn from significant differences; other differences were ignored.

The rotation or sequence of crops is shown in Table VII, in which the entries are arranged according to the date of sowing.

Table	VII.
Showing Crop	Sequence.

1928.	1929.	1930.	1931.		
	2. Radish	6. Radish	10. Radish		
	'French Breakfast'	'French Breakfast'	'French Breakfast'		
	3. Peas	7. Peas	ıi. Peas		
	'Little Marvel'	'Little Marvel'	'Little Marvel'		
 Turnips Yellow Globe 	4. Turnips 'White Stone'	8. Turnips 'White Stone'	12. Spinach 'Flanders'		
	5. Spinach	9. Lettuce	13. Lettuce		
	'Flanders'	'Wonderful'	'Wonderful'		

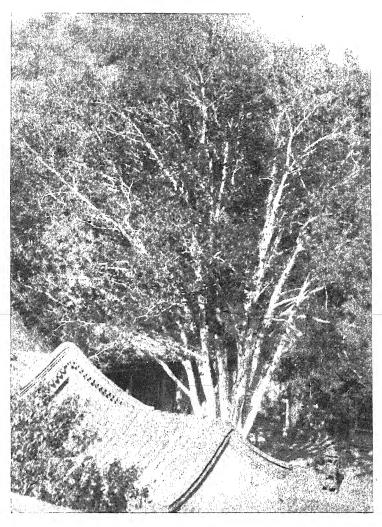


Fig. 94.—Pinus Bungeana in Temple Garden at Peking. (p. 249)



TABLE VIII.

Showing Data from Turnip Crops.

Notes.	* One month from sowing	† Data unsatis- factory ‡ Carbon bisul- phide treat- ment	† October 5	† November 2, fully grown ‡ Larwæ of Chor- tophila brassicae	* One month from sowing † October 5 ‡ November 20, fully grown
Percentage of Pest- infected Roots.	1111	1111	1111	26.50±0.95 20.80±1.55 11.65±0.80 29.00±2.1‡	
Percentage of Fibre in Dry Roots.	1111	1111	14.59±0.81 16.98±0.80 16.16±0.95 18.20±0.52	10.65±1.0 15.56±1.2 19.68±1.6 20.70±0.92	
Ratio Root/ Leaf. Note A.	1111	11 11 11 11 11 11 11 11 11 11 11 11 11	0.33 0.35 0.24 0.76	0.84 0.90 0.98	
Percentage of Dry Matter. Roots, Leaves.	1111	13.70 12.55 12.77 14.40	6.7 5.5 11.6	14.40±0.39 11.44±0.28 12.46±0.33 14.3c±0.27	
Percentage of Roots,	1111	4.4.5. 4.4.5.	6.5 8.2 13.5 17.2	7.30±0.24 6.88±0.17 6.92±0.08 6.74±0.40	
Fresh Weight. 100 Plants. its. Leaves. Lbs.	1111	20.10±1.2 (33.7)† 10.70±0.9 14.15±0.7	11.09 11.20 5.46 7.17	22.0±0.45 30.1±0.31 14.3±0.92 13.2±0.76	Leaves.* 3.13±0.02 3.71±0.10 2.05±0.03
Fresh Weigh 100 Plants, Roots, Lbs.		60.6±2.1 (65.6)† 37.4±1.2 32.5±0.8	3.61±0.05† 2.60±0.12 1.11±0.04 2.44±0.11	37.5±1.4† 41.9±2.6 23.1±1.7 27.2±2.6	" Dry Maller. Roots.* 2.64±0.02 3.26±0.05 2.69±0.07 2.84±0.08
Per- centage sur- viving Winter.	23.8 45.2 4.5	82 77 70 67	1111	1111	centage
Percentage of Dry Matter.	15.91 11.72 14.64 13.57	10.6±0.22 9.9±0.31 10.8±0.24 12.2±0.31	10.69年0.81 9.31年0.53 11.78年1.0 12.79年0.38	1111	Nitrogen Estimations. Percentage in Dry Matter. Laves.† 3.75±0.02 4.36±0.03 5.06±0.03 7.05±0.03 7.05±0.03 7.05±0.03 7.05±0.03 7.05±0.03 7.05±0.03 7.05±0.03 7.05±0.03
Fresh Weight. Ioo Seedlings. Grm.	67.0* 31.7 40.7 47.8	96.6 31.1 29.2	68·7士5·2* 73·3士6·1 27·7士4·6 53·2士4·2		
Percentage of Seedlings established.	26.54±0.4* 18.71±3.1 58.62±0.13 36.80±1.7	27.3 27.3 44.3 41.3	36.9 4.74 4.8	. 1111	Seedlings.* 3.47±0.02 4.02±0.05 3.01±0.02 3.31±0.02
Soil.	Clay Loam Chalk Sand	Clay Loam Chalk Sand	Clay Loam Chalk Sand	Clay Loam Chalk Sand	Clay Loam Chalk Sand
Variety, Date Sown.	'Yellow Globe' 12/9/28 Crop 23/11/28	'White Stone' 4/7/29 Crop 3/12/29	'White Stone' Sown 29/7/30 Data 5/10/30	Crop 15/11/30	
Crop No.	: "	v	∞		

Nore A .- These ratios were calculated on the dry weights.

TURNIPS. CROPS Nos. 1, 4 AND 8.

Establishment.—From Table VIII it is seen that the number of seedlings established in 1928 on the chalk soil was high, nearly 60 per cent.; lower on the clay and sand, and lowest on the loam soil, 18 per cent. In the following year a low percentage establishment occurred on the loam soil; the germination and establishment on the other soils varied between 40 and 45 per cent. Examination by the entomologist confirmed previously excited suspicions: the low percentage establishment was partly due to wireworm damage. In experiment 8 the germination and establishment in the loam soil were higher, due to the killing of the wireworm by an early autumnal series of injections with carbon bisulphide at the rate of 1 oz. to each square yard in 1929.

Early Growth.—After the first year, with the seedlings grown in experiments 4 and 8, the rate of dry weight accumulation was more rapid on the clay and loam soils. The seedlings grew more slowly on the chalk soil. The seedlings growing on the loam were more succulent—i.e. they contained a higher percentage of water—in all three experiments than those growing in the other soils. These seedlings were also rich in nitrogen.

Winter Killing.—In experiment I a differential effect of the winter's frost and rains and of climatic conditions generally was observed. The majority of the plants were killed on the chalk and sand, leaving only one plant in twenty, whereas on the loam and on the sand a quarter of the total number persisted. This differential killing was not in direct proportion to the depth to which the soil became frozen; the chalk, for example, did not freeze to as great a depth as did the sand; it allowed insufficient plants to be weighed, so that the yield data are not given in this experiment.

Growth and Yield.—The injections of carbon bisulphide, given to the loam soil whilst the plants were growing, resulted in a large number of casualties; only 7 per cent. survived. These plants, when mature, were large and particularly leafy, but the smallness of their numbers prevented statistical analysis, and in the table the data are marked as unsatisfactory from this point of view.

The increased space enjoyed by the surviving plants was no doubt partly responsible for their large size. The microflora and fauna presumably suffered from the effects of the carbon bisulphide; the surviving turnips recovered from any check to their growth and yielded well-formed roots.

The necessity of injecting the loam soil was regrettable, but the treatment was highly effective; no further trouble was experienced. It was finally decided not to inject the other soils.

The data presented in the table show the fresh weight of the roots after having had the leaf rosette and the lower portion of the root removed, *i.e.* after "topping" and "tailing." From the chalk soil small roots were obtained in experiments 4 and 8. Larger

roots were obtained from the sandy clay, and particularly from the loam. The leaves of the plants grown on the loam soil were large and more succulent—containing less dry matter than those from other soils; these observations were made with the three crops. These leaves were relatively rich in total nitrogen when compared with those from other soils; this was observed in the seedling stage, when the roots had just begun to swell, and finally in more mature plants ready for lifting. These plants therefore reflected the soil conditions of high nitrogen and moisture content throughout their growing period from small seedlings to mature plants.

At two stages of growth, determinations were made of the fibre content of the roots: the fibre content of the roots growing in the sand was the largest, and was nearly twice that found in mature plants grown in the clay soil. The leaves of these plants contained relatively little nitrogen, after the seedling stage.

The ratios of roots to leaves shown in Table X were all calculated on a basis of dry weights. The ratios observed varied widely according to the growth stage of the plants at which sampling took place. In young plants the ratio root/leaf was low, of the order 0·3, and later rose towards unity. The rapid swelling of the root apparently was not accompanied by further rapid leaf development; it was due to the accumulation of further dry matter, and was not to be accounted for by mere uptake of water by the tissues. In plants growing on the sand this ratio rose earlier than in plants on the other soils. Generally the ratio tended to be low in the plants growing on the loam, owing to the greater leaf development.

Turnips are known to be partial to phosphates in the soil.* The chalk soil contained little available phosphate; the observed yields were low. All root crops demand an adequate supply of potash; the potassium content of the chalk and sand was low. The yields from these soils were low. Unfortunately it has not been possible to proceed with the chemical analyses of the tissues of the plants, so that no data are available on the uptake of these salts (ions) from the soils. The above observations are therefore presented in a tentative manner.

Pests.—Counts were made of the infected roots damaged by larvæ of Chortophila brassicae. Fewer plants, one in ten, grown on the chalk were infected, on the sand nearly one-third, on the sandy clay one-quarter, and on the loam one-fifth of the total number were damaged. The hard nature of the chalk, although it cracked freely, may have been responsible for this relative immunity by discouraging oviposition. The sand was loose, the sandy clay and particularly the loam were more compact around the plants. The high fibre content of the plants growing on the sand had not decreased the number infected; the smaller plants growing in the chalk which were relatively free from the pests also contained a high percentage of fibre.

Table IX.

Showing Data from Radish Crops ('French Breakfast').

Cr N	op o.	Da	Date of Sowing.		Soil.		Percentage of Seedlings established.	Yield. Fresh Weight of Roots from 20 yds. Lbs.		Fresh Weight per 100 Plants. Grm.		
3		21/5/29 Crop 28/6/29			Clay Loam Chalk Sand		57 18 55 60	11·21±1·2 1·46±0·4 3·62±0·2 4·90±0·5			614 289 195 287	
7	,		27/5/30 Crop 31/6/30		Clay Loam Chalk Sand		59 50 57 62	9.0	5±0·39 0±0·62 3±0·70 0±0·75		427 573 128 321	
11			27/5/31 Crop 2/7/31		Clay Loam Chalk Sand		59 52 80 71	10.2	8 ±0·41 22±0·40 95±0·13 90±0·15		740 1061 385 402	
Crop No.	Date Sow		Soil.		Percentage of Roots.	Dry	7 Matter. Leaves.	Ratio Root/ Leaf.*	Percentage of Nitrog Dry Matter. Roots. L			
3	Crop Chalk 6		6·	5·66±0·13 11·8 5·96±0·08 13·6		1·37±0·13 1·87±0·16 3·65±0·14 3·71±0·18	1·23 0·65 0·98 1·22	3·85 4·24 3·26 3·32		2·50 2·87 I·78 I·73		
7	Cro	Loam 7 rop Chalk 11		7:	7·42±0·49 1·51±0·83		1·70±0·29 9·70±0·46 4·54±0·32 2·31±0·83	1.07 0.72 1.17 1.06	2·69 2·06		3·77 3·89 3·20 3·44	
II	Crop Chalk		6·	94±0·11 40±0·14 14±0·19 10±0·10	I	I·02±0·09 7·90±0·24 2·2I±0·16 2·12±0·18	0.65 0.50 0.69 0.62	1·76±0·0 1·93±0·1 1·47±0·0 1·64±0·0	8	2·98±·07 3·44±·08 2·84±·08 3·06±·07		

^{*} Calculated on dry weights.

RADISH. VARIETY 'FRENCH BREAKFAST.' CROPS NOS. 3, 7, 11.

Establishment.—With the exception of the loam soil in 1929, all the establishment figures showed satisfactory germination and establishment of the seedlings. Possibly the seedlings in the loam soil in that year suffered from the after effects of the carbon bisulphide injection given ten months previously.

Growth and Yield.—The data presented show the yield of cut roots and also indicate the size of the plants. In the first season the clay soil yielded well, but in 1930 the yield fell, but recovered again in 1931. The yield from the loam soil was very poor the first year, but in later years heavy crops were obtained. The chalk never gave a high yield. The yield from the sand was fair in all years.

In 1931, partly owing to a later date of lifting, and partly also to the seasonal climatic conditions, the plants were heavier on all soils. On the chalk soils the crop was "late"—the plants did not develop so rapidly, and, although the plants were lifted one week after those on the sand, they were small.

The leaves of the plants growing on the loam contained little dry matter in all years; on the chalk and sand the leaves of the plants contained more dry matter. The roots also of plants growing in the sand and chalk contained a higher percentage of dry matter than those from either loam or clay in each year. With a surface-rooted crop, such as the radish, the plants were subjected to the different conditions of soil moisture at the surface, and these data from the plants reflect the data obtained from the soils indicating the dryness of the chalk and sand.

The root/leaf ratios show that on the loam soil the plants were particularly leafy: the observed difference in leaf area between plants growing in loam and chalk was of the order of 100 per cent. in 1930. The profuse development of leaves was accompanied by a higher percentage of nitrogen in the leaf and root tissues of the plants grown in the loam.

The plants grown in the chalk contained less nitrogen in the leaves and roots; their leaves were small, the ratio root/leaf tended to be high, particularly in 1930 and 1931. The plants were small and the yield low; there can be no doubt that these plants suffered from nitrogen deficiency. The ratio of nitrogen contained in the leaves and roots of plants growing in the chalk and loam was higher than the ratio of total nitrogen in the soils, chalk and loam.

Pests.—In late June 1930, the young radish plants suffered from the turnip flea beetle, Phyllotreta undulata. The symptoms of attack became apparent, when the first young leaf was unfolding, between the cotyledons. Plants growing on the sand were first attacked, followed by an attack on the rapidly growing plants in the loam. Those on the clay were attacked a few days later. The small plants on the chalk, the last to show symptoms of attack, suffered a little more severely than plants on the other soils, as their leaves did not grow very rapidly; the proportion of the "pitted" or "damaged" area to that undamaged was higher. Generally the attack would not have been regarded as a serious one under field conditions. The reader is referred to Newton's paper on the biology of flea beetles.

PEAS. CROPS Nos. 2, 6, 10.

Establishment.—The number of seedlings established on the loam soil in 1929 was lower than on any of the other soils; this tendency was again observed in 1931. The figures for all soils, however, were quite high.

Early Growth and Development.—In the first year the plants on the loam soil did not grow rapidly in height—in subsequent years the

tallest plants were on this soil. In the third year the plants on the chalk and sand were very small. In the earlier years the plants on the sand produced their flowers a little earlier than did plants on the other soils; the great reduction in the size of the plants in the third year caused the number of flowers to be low. In the chalk the plants produced few flowers in the third year.

TABLE X.

Showing Data from Peas. Variety 'Little Marvel.'

Crop	Date of	Soil	Soil. Percentage of Seedlings established.		Ap	Height to No. of Apical Flowers		Fresh	Crop per 20 yard Fresh Weights,			
No.	Sowing.	3011.			Bud. Cm. Date.		(Relative Date.*		icking.	2nd Picking.		
2	27/3/29 Crop 8/7/29	Clay Loam Chalk Sand	77·1 47·9 85·3 80·6		3/6 18 10 15 25	·4 ·4 ·9	15/6/29 88 24 74 100	19·8 5·42 20·61	± 0·7 ± 0·7 ± 0·9 ± 0·1	0.31		
6	20/3/30 Crop 8/7/30	Clay Loam Chalk Sand	68·7 68·1 72·7 71·0		68·1 72·7		68·I 75·0 19 72·7 34·I 25		15·68 9·04	士 0·6 士 0·5 士 0·3	7 1·27 3 0·61	
10	26/3/31 Crop 12/7/31	Clay Loam Chalk Sand	58.3	士 I·2 士 O·9 士 I·6	4/7/ 42 82 29 19	· 5 · 4 · 9	9/6/31 103 127 87 100	5.9	士 0.30	0.32		
Crop No	Date of Sowin		oil.	Percent Pod. Weig	Fresh	men	Develop- nt. No. Nodules.	Percentage Nitrogen Plants (Di	in Ni	centage of trogen in Soils,		
2	27/3/2 Crop 8/7/2	Los Cha	am 47.		8 5	Fai Fer	ir No. ir No. w ofuse	2·09 2·44 1·70 2·26		0.085 0.259 0.058 0.063		
6	20/3/3 Crop 8/7/30	Loa Cha	m 43· lk 37·		o Prof		o Profuse o Few		Profuse Few			
10	26/3/3 Crop 12/7/3	Loa	m 36. lk 21.		0	Pro Fev	r No. ofuse v r No.					

^{*} Sand expressed as 100.

Yield.—In the first year the yield from the loam soil was low—in the subsequent years this soil produced the heaviest crops. The yield

from the clay, chalk and sand decreased each year; from the sand the yield fell from 37 lb. to $2\frac{1}{2}$ lb., and from the chalk from 21 lb. to 6 lb. The figures in the table show that in 1929 the plants in the clay soil ripened their pods more slowly; a greater weight of pods was picked at the second date. From crops grown in 1930 and 1931 the greatest weight was picked from plants growing in the loam. These plants continued to grow vegetatively for a longer period and also yielded swollen pods for a longer time.

Percentages shown in the table indicate the ratio of the carpels (empty pods) to the total fresh weight of the fruit, including seeds. In 1929 the pods were picked at very much the same stage of maturity; this ratio was constant for all soils. In 1930 and 1931 the seeds in the pods of the plants in the loam had not attained to quite the same stage of maturity when the crop was gathered, so that the "pod" (carpel) contributed a larger proportion to the total fresh weight. In 1931 the pods had begun to dry on plants growing in the sand, so that the percentage was low. It was found that the yield differences were primarily due to the size of the plants and the number of pods picked, and were not caused by an increase in the size and weight of the pod, although larger plants produced larger pods.

Root Development (Nodules).—The roots were examined and it was seen that plants growing on the clay tended to form a central tap-root, thicker than that seen in other soils. The number of nodules produced was reasonably large. In the 1929 crop, the plants growing on the loam soil possessed a poor root system, tending to be very fibrous, but with small lateral roots. Nodule development was not profuse. In subsequent years the root development was highly satisfactory, and a large number of nodules was formed. In the chalk the root development was very good in all years, but there was a tendency for the larger thicker roots to be covered with a thin mucilaginous outer layer. The number of nodules developed was small. In the sand a well-formed root system, with profuse nodule development, was observed. The system as a whole was not quite so fibrous as that seen in the chalk.

The low nitrogen content of the plants growing in the chalk was, no doubt, partly due to the low nitrogen content of that soil and partly due to the poor development of root nodules. The profuse development of nodules in the sand did not cause the nitrogen content of the plants to be as high as that of plants growing in the loam which contained more nitrogen. To a limited degree the plants reflected the nitrogen content of the soil in which they grew.

Disorders and Diseases.—In 1931 the growth of the plants generally was slow, but particularly so on the sandy soil; moreover, these plants did not remain green and healthy-looking. A close examination was made, but no signs of thrips nor of Ascochyta pisi were detected; other pests and fungi were absent. The possibility that these symptoms were due to mineral deficiency must be entertained; they were absent on plants in the other soils.

5

12

Average Yield Percentage Crop No. Growth in Height. per 20 yds. Fresh Weights, surviving Winter. Date of Sowing. Soil. Cm. Leaves. Lbs. Date 4/4/29 Clay 62.0 21.5 11.04 22/12/29 (19.0)† (1.04)† Loam 2.6 17·4 8·7 35.0 Chalk 5.95 Crop 1.10 1/5/30 Sand 31.0 Length of Lcaf Relative to Sand = roc blade 9/10/31 686 4.0 Clay 85·0 2/9/31 3.0 36 Loam 22.0 283 2.5 Chalk Crop 47.0 52.0 2.8 Sand 100 13/4/32 E-och Weight

TABLE XI. Showing Data from Spinach Crops. Variety 'Flanders.'

Crop No.	Date of Sowing.	Soil.	of 100 Plants. Leaves only.	Nitrogen in Leaves. Dry Weights.	Dry Matter in Leaves.
5	22/12/29 Crop 1/5/30	Clay Loam Chalk Sand	30·2 lbs. (53) ,, 28·4 ,, 55·9 ,,	3·19 ± 0·12 3·91 ± 0·09 3·01 ± 0·08 2·83 ± 0·07	29·2 20·0 30·4 30·7
12	2/9/31 Crop 13/4/32	Clay Loam Chalk Sand	Relative to Sand * 264 354 119	† † †	28·7 21·3 32·7 33·2

* Expressed in terms of sand yield.

SPINACH. CROPS Nos. 5 AND 12.

(Data in Table XI.)

The variety 'Flanders' was sown in autumn and the plants lifted in the following spring. Data were collected on the overwintering of spaced plants in the years 1928-29 and 1931-32. In both winters the largest number of plants survived on the clay soil; very few plants growing in the loam soil overwintered. The percentage of plants growing on the chalk and sand that successfully overwintered was between 30 and 50 approximately.

The few plants surviving on the loam soil grew quite large, as the data in the table show, where the fresh weights of 100 plants and the relative sizes are compared. The yield was low when compared upon the basis of area occupied; in both experiments the highest yield was obtained from the "clay" soil. In experiment 12 the plants removed at a very early date were rather small, so that no useful

[†] Data unsatisfactory from statistical standpoint.

purpose would be served by comparing the yield data of the two seasons. The leaves of the plants growing in the loam contained the highest percentage of nitrogen (experiment 5) and little dry matter (experiment 12); no doubt this high water content was partly responsible for the high percentage of casualties in the winter.

TABLE XII.

Showing Data from Lettuce 'Wonderful.'

Crop No.	Date of Sowing.	Soil.	Percentages survi Dates. 17/2/31 28/3/31	Yield per 20 yds. Row. Leaves. Lbs.		Weight of roo Plants, Fresh. Leaves. Lbs.		
9	2/9/30 Crop 4/4/31	Clay Loam Chalk Sand	70·0 50·0 44·0 19·0 45·0 14·0 54·0 33·0	31·0 11·7 4·5 9·3	6·2 6·0 0·3 1·1		6·38 15·40 4·02	
13	4/9/31 Crop 14/3/32	Clay Loam Chalk Sand	21/3/32 5·9 17·5* 9·4 5·8	93	2·1 1·2 2·3 1·5		7·14 Relative to sand = 100 135 142 87 100	
Crop No.	Date of Sowing.	Soil. Percentage of Dry Matter. Leaves. Percentage of P ₂ O ₅ in Lettuce Leaves. Dry Weight.				Pe	ercentage of K ₂ O Lettuce Leaves. Dry Weight.	
9	2/9/30 Crop 4/4/31	Clay Loam Chalk Sand	14·6 12·7 18·2 14·2		3.09 3.32 3.94 3.32		2·78 5·00 3·05 2·98	
13	4/9/31 Crop 14/3/32	Clay Loam Chalk Sand	20·7 18·7 26·2 24·2				=	

^{*} After transplanting further seedlings into these rows.

LETTUCE. CROPS Nos. 9 AND 13.

VARIETY 'WONDERFUL.'

Establishment and Overwintering.—Requisite thinning took place when the seedlings were quite small; a further thinning was also carried out, so that ample space was given to the plants in late autumn. On the different soils the percentage of plants surviving the winter varied. Plants died rapidly on the loam soil in experiment 13—in fact, the mortality rate was so high that transplanting from similar soil was attempted, despite which the number of plants surviving was very low. As with spinach, the highest number of surviving plants was found on the sandy clay soil; the chalk and sand did not allow a high

percentage survival, and very few survived on the loam in 1931-32. A severe frost occurring in April was responsible for the death of many plants in the chalk: the plants were "lifted" out. No consolidation of the soil surface by treading or other means took place; possibly a number of the plants could have been saved by such means.

Yield.—The figures in Table XII indicate the yield of the plants in early spring. The yield obtained from the chalk and sand was very low, as the number of plants surviving was so small. The largest yield was from the clay soil, due to the higher rate of survival. The plants grown in the loam were the largest.

Generally the growth made in winter on all four soils was not sufficiently rapid to make this lettuce a commercial success in the open in this country.

Chemical Analyses.—In the ash of the plants from the different soils there were appreciable differences in the amount of potassium present. The clay soil contained twice as much available potash as did the loam, yet plants in the latter soil contained more potash. Although the chalk soil was then relatively poor in potassium, the resulting plants compared favourably with those grown in the sandy soil.

Plants grown on the chalk soil were rich in phosphates (P_2O_5) ; the soil, however, contained a low percentage of available phosphates. On the other hand, the plants growing in the loam soil contained an equal percentage to that found in plants on the sand. The phosphatic content, total and available, of these two soils differed. The lack of correlation between the phosphates of the soil and of the plant suggests that other facts than those revealed by the chemical analyses influence the rate of uptake of this element.

Conclusions.

- (I) Germination, Establishment, Overwintering.
- (A) Clay.—In this soil germination and the subsequent establishment of the seedlings were generally satisfactory. A high percentage of plants successfully overwintered—particularly was this noticeable with spinach in 1928 and 1931, and with lettuce in 1930. It is suggested that, amongst other factors, the mechanical composition of this soil, containing clay and sand, was largely responsible for such results.
- (B) Loam.—Germination and establishment were poor in this soil. Even after killing wireworms, partly responsible for seedlings dying off, the number of plants overwintering was low. The "sappy" nature of the early leaf growth, containing a high nitrogen and water content, was held largely responsible for this high rate of mortality.
- (C) Chalk.—All seeds germinated well in this soil. The resultant seedlings persisted but grew slowly. Overwintering was satisfactory with the exception of the lettuce crop in 1930, when a very severe frost "lifted" the plants and detached a surface layer of soil from the underlying matrix.

(D) Sand.—On this soil germination was generally rapid. After a severe frost few seedlings or larger plants remained alive. Spinach, however, overwintered on this soil fairly well in one experiment.

(2) Ratio of Root to Leaves.

These ratios were calculated from dry weights obtained after lifting and drying many representative samples of the plants. They show the distribution of the manufactured food products of the plant at the growth stage attained when sampling took place; the radish plants from which data are shown were lifted, weighed, dried, and re-weighed when considered to be sufficiently well developed for their ordinary domestic uses. This judgment of development was based primarily upon the size of the "root," so that the ratios indicate the leaf development that took place before the roots attained this phase of their growth. In such a crop no leaves are lost by previous leaf-fall—other than the cotyledonary leaves—so that the total of the shoot system/root was estimated.

TABLE XIII.

Showing the Ratio Root/Leaf calculated on dry weights.

Crop.		Soil.	1929.	1930.	1931.	Average for Soil.
Radish .	•	Clay Loam Chalk Sand	1·23 0·63 0·98 1·21	1.07 0.72 1.17 1.06	0.65 0.52 0.69 0.62	0·98 0·62 0·95 0·96
Average			1.001	1.002	0.61	0.87
Turnips .	•	Clay Loam Chalk Sand	1·6 1·3 2·0 1·2	0·86 0·84 0·90 0·98		1·23 1·07 1·45 1·09
Average			1.5	0.94		1.21

The figures in the table indicate that the leaf development of plants growing in the loam was rapid; on the chalk the ratio root/leaf was a little higher—the leaf development was poor. As previous data have shown, this tendency on the chalk was accompanied by a high percentage of dry matter in the leaves, so that small, tough, dry leaves were produced. The toughness was particularly well shown by the winter lettuces.

From the seasonal viewpoint, the averages of the plants in all soils in 1929 and 1930 show close agreement. In 1931 the plants appeared "leafy"—a greater leaf area—reflected in a reduced ratio of root/leaf. Whilst the greater rainfall in this season may be held partly responsible for the greater leaf development, the lack of crispness

and turgidity in the roots would seem to indicate that, although the plants were lifted when the roots were judged to be the correct size, they were not at the same growth stage as those sampled in the previous years.

With turnips also, a higher ratio root/leaf was obtained from plants growing on the chalk. High ratios were also obtained from

plants in the sand.

The whole evidence may reasonably be interpreted as indicating the poverty of the chalk soil in free water and/or soluble nitrogenous compounds, conditions favouring leaf development; the loam soil fulfilled the necessary conditions for leaf production.

(3) Leaf Crops.

The yield of such crops as lettuce and spinach depended upon the number of plants surviving and their leaf development. It has been generally observed that in the preceding experiments plants growing in the clay soil overwintered well. The largest plants were obtained from the loam soil, where the mechanical and chemical conditions of the soil provided an adequate supply of moisture and nitrogenous compounds. Generally the chalk soil did not provide such conditions: leaf development was poor, and tough small leaves were produced. The quality of such produce was so poor as to render the crop of little value.

(4) Uptake of Nitrogen, etc., from the Soils.

The plants in the four soils were grown at equal distances, so that where there were no casualties it was possible to calculate the relative amounts of nitrogen taken up from a given area by estimation of that found in a given number of plants. This estimation was made by calculation from the data obtained of the total dry weights and of the percentage nitrogen contained in the dry matter. For comparative purposes the figures showing the total uptake have been expressed in the table in relative terms, the mass taken up from the Bagshot sand, the natural Wisley soil, being expressed as 100. Alongside these figures representing the mass taken up are shown figures which indicate the relative amounts of nitrogen present in the soil. But few determinations were made of the potash and phosphates taken up: these are also shown in the table; the data have been similarly calculated.

The table shows that radishes took up a greater amount of nitrogen from the loam soil in crops 7 and 11. Smaller quantities were taken up from the chalk and sand. In crop 3 the loam did not yield its nitrogen readily. Similarly, in the case of the early crop of spinach, much nitrogen was not taken up. These early figures may be partly accounted for by the injection of carbon bisulphide in this soil, but it is more likely that the gradual decomposition of the organic matter in the loam soil rendered further nitrogen available. The later figures from crop 11, radish, support this explanation.

Table XIV.

'towing the relative total amounts of Nitrogen, Potash, and Phosphates taken up from the soils by certain crops.

Crop.	No.	Date of Crop.	Soil.	N taken up.	N present in Soil.	Notes.
Radish	3	28/6/29	Clay Loam Chalk Sand	244 51 78 100	95* 291 59 100	* 1928 analysis
Radish	7	31/6/30	Clay Loam Chalk Sand	94 144 28 100	135† 410 92 100	† 1931 analysis
Radish	11	2/7/31	Clay Loam Chalk Sand	190 263 54 100		
Turnip	8	15/11/30	Clay Loam Chalk Sand	168 219 102 100		
Spinach	5	1/5/30	Clay Loam Chalk Sand	56 83 52 100		Leaves weighed only. Roots not estimated
Lettuce	9	4/4/31	Clay Loam Chalk Sand	83 190 86 100	Total. Avail.§ 68 34 116 394 98 12 100 100	‡ Phosphates as P ₂ O ₅ 1931 analysis § Available
Lettuce	9	4/4/31	Clay Loam Chalk Sand	82 319 72 100	Total. Avail.§ 116 210 124 100 92 75 100 100	Potashas K ₂ O 1931 analysis § Available

The nitrogen taken up from the sand caused a decline in the percentage present in the surface layers. This must be remembered in considering the relative figures.

The total phosphates taken up by lettuce plants reflected the phosphatic content of the soil except in the case of the loam, where the ratio of phosphates taken up from the loam soil to that from the sand—190/100—was greater than the ratio of total phosphates in the soil—116/100—but much less than the ratio available (citric-soluble) phosphates in the soil, 394/100. Although the ratio of available phosphates in the clay to that in the sand was low—34/100—the ratio of phosphates taken up was twice as large, 68/100.

The potash taken up by lettuce plants from the loam as compared with that from the sand gave a high ratio of 319/100. The ratio of potash present in the soil was 124/100; equal percentages seemed available by the chemical tests, yet the plants took up very much more from loam. Growth of the plants in the loam was much more rapid, and with this leaf crop it is suggested that a low nitrogen content of the soil prevented rapid growth in soils other than the loam.

(5) Flowering and Fruit Development.

Plants growing in the sand showed a tendency to flower a few days earlier than those in other soils; plants growing in the loam, where vegetative growth was more vigorous and prolonged, had a longer flowering period than those in any of the other soils. This was particularly noticeable with garden peas. As far as the rate of ripening of the fruits was critically examined, it was observed that fruits (pods) of plants growing in the Bagshot sand matured most rapidly. There was little or no significant difference between the rate of ripening of the fruits of plants growing in the clay mixture and in the loam. Plants in the chalk matured their fruits slightly more rapidly than did plants in the clay and loam.

These observations are in general agreement with the more detailed observations made at Potterne by Marsden Jones and Turrill studying the influence of soil conditions on certain wild plants. MOEN has made a study of the influence of soil conditions on vegetable growth. He too records that early ripening was frequent on a sandy soil. He found, however, clay a most unsuitable soil for autumnal sowing—in the Wisley experiments, provided the plants were established, they overwintered well on a clay mixture soil.

These experimental observations have provided data showing the influence of soil conditions on the growth of short-lived plants; the characteristics of the soil have been recognized. During the last few years a number of perennial garden plants have been grown in these soils and their seasonal behaviour, persistence and other expressions of growth observed. By such tests it is hoped that much useful information will be obtained regarding the soil conditions necessary for the successful cultivation of many plants, including species recently introduced to horticulture.

The author wishes to express his thanks to his colleagues for their kind help and co-operation; he is indebted to the entomologist and to the mycologist for many careful examinations of the crops and of material suspected of harbouring insect pests or fungus diseases.

In the presentation of the chemical data every effort has been made to check each step in the calculations made from the estimations and records of Dr. Darbishire; any errors are the writer's [M. A. H. T.]. It is very unfortunate that this promising line of chemical inquiry cannot be further explored at Wisley, for our precise knowledge of the nutritional requirements of vegetables is so scanty, and a unique opportunity exists for a biochemical investigator.

SUMMARY.

This paper reports experiments made with vegetables by growing crops in four different soils—namely, a sandy clay, a fibrous loam, a chalk, and a sand soil. These soils were collected at Wisley and placed in twenty-four large containers each holding 20 tons. The crops were grown for three years, and the data concerning certain physical and chemical properties of the soils were obtained during the growing period.

Crop growth was estimated by observation, measurement and weight. The data were subjected to various methods of statistical analysis. Generally the loam soil rich in a potential nitrogen supply produced large plants. Overwintering, of certain crops, was more satisfactory on the sandy clay mixture. Establishment of seedlings was good on all soils when wireworms were killed in the loam soil. Observations of pests and diseases were made. By making certain chemical analyses of the dried tissues of the plants, the uptake of mineral and other elements from the soil has been determined.

Further empirical observations of the growth of horticultural perennial plants will be reported in a later paper.

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NITRIFYING POWER, GLUCOSE DECOMPOSING POWER AND PRODUCTIVITY IN DIFFERENT SOIL TYPES.

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A LARGE number of investigations have been carried out in the past with the idea of correlating the magnitude of various microbiological activities occurring in soils with the productivity of those soils. As a result it has been established that certain microbiological activities, such as nitrifying power and glucose decomposing power, run parallel with productivity, except where the soil conditions or treatment have been such as to repress or to exalt these activities unduly. For examples of such exceptions, one may refer to the work of Waksman (1), who found that liming greatly increased the power of a soil to nitrify added ammonium sulphate, so that the parallelism between nitrification and productivity no longer existed. Further, WAKSMAN and STARKEY (2) found that continued treatment of a soil with ammonium sulphate had so lowered the pH of the soil, and increased the fungal flora, that the nitrifying power had been greatly depressed, whilst the ability of the soil to evolve carbon dioxide from glucose had been considerably enhanced.

The experiments referred to above were made on soils which were all of the same type, but in which varying degrees of productivity had been induced by different manurial treatments. On the other hand, the work reported below has been carried out on soils of different types. Usually, when comparing soils of different types, these soils are in different districts, and have different aspects, so that the yields are affected by climatic conditions which are not identical for all the soils. These uncertain factors have been eliminated in the experiments described below, for the soils were assembled in the same locality and arranged so as to avoid favouring any one unduly as to its aspect.

The soils and their arrangement are described in the previous article (p. 251).

Experiments were made as follows:

Sampling.—Four borings were taken from each pit to a depth of 6 inches. Since it was found impossible to carry out tests of all the pits separately, duplicate bulked samples of the soils were obtained by dividing the plots into two equal groups and combining the three samples of each soil obtained from each group. As these duplicate samples gave good agreement, only the mean results are presented.

Samples were taken on three occasions, viz. June 1931, November 1931, and February 1932.

Microbiological Activities.—Two microbiological activities were estimated—the nitrifying power and the glucose-decomposing power.

The nitrifying power was determined by the soil method in which 30 mgm. of nitrogen as ammonium sulphate are added to 100 gm. of soil, together with just sufficient calcium carbonate to neutralize the theoretical amounts of nitric and sulphuric acids that could be formed. soil is brought to its optimum water content, and the nitrogen converted into nitrate is estimated after 28 days' incubation at 28° C.

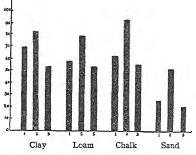
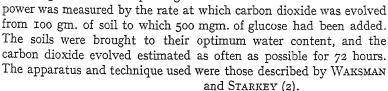


FIG. 95.—SHOWING MEAN NITRIFYING Powers of Soils sampled:

(1) June 22, 1931; (2) Nov. 2, 1931; (3) Feb. 8, 1932.

The glucose-decomposing



The results of the nitrification tests are shown graphically in Fig. 95, expressed as the percentages of the added nitrogen which were nitrified.

Mgms. CO. Hours.

Fig. 96.—MEAN OUTPUT OF CO. FROM SOILS TREATED WITH GLU-COSE AT 27° C.

Soil samples taken Nov. 2, 1931. —x— Loam. —.— Chalk. ---- Clay. —o— Sand.

It will be seen that in each soil the nitrifying power was highest at the November 1931 sampling and lowest in February 1932. At each sampling the soils fell in the same order of nitrifying power namely—(1) chalk, (2) clay, (3) loam, (4) sand, in decreasing order. The anomalous result given by the chalk soil at the first sampling is only apparent, since by accident a double amount of ammonium sulphate was used on this soil, and so the percentage figure is unduly low when compared with the others.

Actually a larger quantity of nitrogen was nitrified by this soil than by any of the others.

The results of the carbon dioxide evolution measurements were similar at all three samplings. One of the sets of results, that of the November 1931 sampling, is shown in Fig. 96.

The differences in the amount of carbon dioxide evolved by the soils are clearly shown, and it is evident that the different rates were maintained throughout the duration of the test, except in the chalk soil. Here the rate of evolution began to increase rapidly after about twenty hours, and ultimately this soil gave the largest total amount of carbon dioxide.

Under the conditions of the test, i.e. where a fairly slow stream of air is drawn over the soil, the oxygen actually in the soil must become rapidly exhausted, and conditions will become anaerobic. Fermentation of the glucose with the production of acids will then become the predominating reaction, and in the presence of carbonates

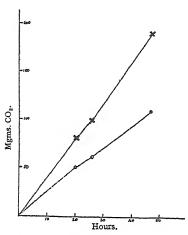


Fig. 97.—Evolution of CO, from BAGSHOT SAND SOIL TREATED WITH GLUCOSE:

-x- in the presence, and -o- in the absence of Calcium Carbonate.

these acids will be neutralized with the evolution of extra carbon dioxide. This extra carbon dioxide would seem to account for the sudden increase in output from the chalk soil, since this is the only soil containing carbonate.

The question remains. To what extent has the carbon dioxide evolution from the chalk soil been affected in the early stages, i.e. up to twenty hours, by the presence of carbonate?

In order to obtain information on this point, an experiment was made in which the carbon dioxide evolution from the carbonate-free Bagshot sand was compared with that from the same soil to which 5 per cent. of calcium carbonate had been added, 500 mgm. of glucose

being added to each soil. The results are shown in Fig. 97, and it will be seen that the presence of carbonate resulted in an increased output of carbon dioxide, and that this was manifest from the start of the In view of this result it is considered that in comparison with the other soils, the chalk soil gave an unduly large output of carbon dioxide even in the very early stages. soil should therefore rank lowest, even below the sand.

There is not likely to be any great error involved through one soil having a relatively large population of fungi, which are active carbon dioxide producers, since all soils are of about the same pH. It may be noted, however, that the loam soil, with the greatest output, is slightly more acid than the others.

The glucose decomposing test therefore places the soils in the following order of decreasing activity: (1) loam, (2) clay, (3) sand, (4) chalk. This order is quite different from that given by the nitrification test, and it remains to be seen which order agrees most closely with the productivities of the soils as expressed by crop yield data. These are found in the paper by DARBISHIRE and TINCKER (p. 251), the yields being frequently expressed relative to that from the sand as 100.

The figures based on the yield from 20 yards are not considered always reliable for assessing the relative productivities in the crops which had to stand throughout the winter, since these yields depended so largely upon the number of seedlings which overwintered successfully. Therefore in these the yields based on the weight of 100 plants have been considered, although even here the increased space available for each plant resulting from poor overwintering or poor establishment of the seedlings may have affected the yields favourably in certain instances.

A further point is that the loam soil had to be treated with carbon bisulphide in 1929 in order to eliminate wireworms. The combined effect of the wireworms and the partial sterilization effect of the carbon bisulphide has caused unreliable data to be obtained in the crops of turnip, radish, pea and spinach on this soil in 1929. For how long this partial sterilization effect persisted is debatable, but it would seem that it had worn off by the following year.

The majority of the crop yield data had been obtained prior to the making of the microbiological analyses. This is unfortunate, since it is generally agreed that such analyses give a measure of the potential crop-producing powers of soils, and may not give any indication of past productivity. However, since these soils have not been manured at all, one may be justified in using these data.

The yield data show that the loam was the most productive soil, followed generally by the clay, with the chalk and sand the least productive. This order is most clearly shown by the crop data obtained nearest to the time at which the microbiological analyses were made, and moreover it agrees well with the order obtained on the basis of carbon dioxide evolution.

The nitrification test has conspicuously failed to reveal the relative productivities of the soils. The chalk had the largest and the sand the smallest nitrifying power, yet these soils were alike both poor crop producers. The close similarity in pH between the soils would seem to rule out the acidity factor, but possibly in the chalk soil the presence of an abundance of calcium carbonate may have been instrumental in maintaining a large population of nitrifying organisms. The other soiis were all free from carbonate. Under the test conditions, therefore, the chalk soil might well have proved to have a high nitrifying power. Under natural conditions the case may be otherwise, since even a large population of nitrifying organisms would be helpless in the absence of nitrogen to nitrify. The chalk soil is lowest in total nitrogen, and probably the nitrifying organisms in it were inadequately supplied with ammonia. In the loam soil, although the nitrifying power is lower than in the chalk, yet the total nitrogen is four times as large, and a more adequate supply of ammonia for nitrification may have been available.

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The author desires to thank the Director of the Royal Horticultural Society's Gardens, Wisley, for permission to take soil samples, and Dr. M. A. H. TINCKER for permission to use his and Dr. DARBISHIRE'S data, as well as for help in taking the samples.

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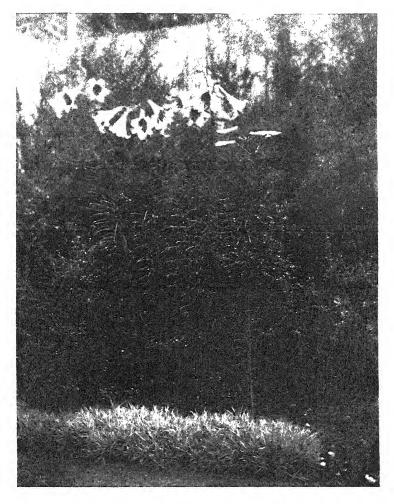


Fig. 98.—Lilium sulphureum at East Dereham.

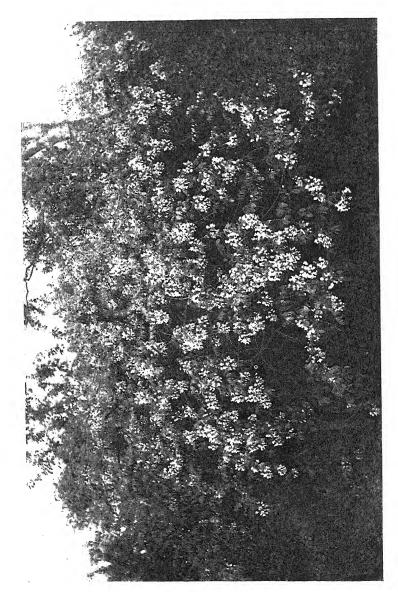


Fig. 99.—Wistaria venusta at East Dereham.

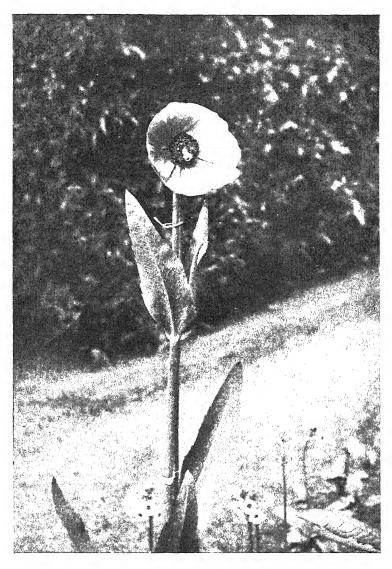


Fig. 100.—Meconopsis grandis at East Dereham.



Fig. 101.—Rhododendron Loderi with Meconopsis grandis in foreground.

THE GARDEN AT HEATHFIELD, EAST DEREHAM.

By Hugh Wormald.

This garden is situated about one mile north-west of the town of Dereham, which is about the centre of Norfolk. The soil is very light loam with pure yellow sand below.

In 1912 there was just the house, a cottage, and a scrap of garden, the rest was a very exposed meadow. Since then we have taken in five acres of the old meadow land. There is nothing spectacular about the garden, it is simply a garden with some nice things in it, and we try to have something of interest at all seasons of the year. A country lane ending in a carriage drive, lined on either side with Oak trees growing on grassy banks, which are planted with Ferns, Primroses, Daffodils, Snowdrops and Bluebells, brings one to the garden, which is surrounded by Thuyas, and planted in all directions with Thuya and Yew hedges. These make a perfect background and have formed most efficient wind breaks.

The house is covered (in lieu of the original Ivy) with Wistarias, Honeysuckle, yellow Banksian Rose, Cydonias, White Jasmine and Solanum jasminoides. At the south-west corner of the house there is a fine Magnolia grandiflora, now, alas! dying, attacked by a fungus disease at the base of the trunk. Facing due south against the diningroom window is Feijoa Sellowiana, which flowers profusely every year but has never fruited. Near to this is Ceratostigma Willmottianum, and although the semi-woody stems die to the ground in most winters, a fresh crop springs up every year. A narrow border runs round the house, in which, facing south, we grow various Tulip and Crocus species.

Leaving the house by the front door, we turn to the left and come to an old wall on which grow Sophora tetraptera (which flowers and fruits freely and is quite hardy), Ceanothus thyrsiftorus and C. papillosus, Xanthoceras sorbifolia, Clerodendron Fargesii, Camellia 'Lady Clare' and two white hybrid Camellias. Following round the wall, which turns here at right angles, we come to a nice plant of Ribes speciosum, next to this Carpentaria californica and Abutilon vitifolium. The wall now joins the back of the cottage, which is covered by Solanum crispum (20 feet high) and Magnolia Delavayi. At the end of the cottage wall is a short wooden fence covered with Ceanothus and Mutisia ilicifolia and M. oligodon, and in a border in front of these Lilium sulphureum (fig. 98) does well.

Facing us is a Yew hedge 9 feet high and 60 yards long. On this side of the hedge there is an herbaceous border 15 feet wide divided from a Rose border 12 feet wide by a grass path. Leaving this on our left, we come to a lawn, at the bottom of which we get a glimpse of a small (and I fear neglected) rock garden. There is a Judas tree on our left and a bed of *Gentiana sino-ornata* at the foot of a fine old Birch

tree. On the right of the lawn is an herbaceous border backed by an old Yew hedge; this is joined by a shrub border containing flowering Cherries, Viburnum rhytidophyllum, Philadelphus and other plants, with Birch trees in front of them, and climbing over Cherries, Birches, etc., is a plant of Wistaria venusta (fig. 99), which Mr. Bean tells me is the largest in the country. Crossing the lawn, we come to the old orchard, which in reality is a few old and unproductive Apple trees growing in grass carpeted with Daffodils. On our right is a bank of blue and white Anemone blanda, with a patch of Cyclamen at the foot of an old Oak.

Facing us is a high Thuya hedge, and passing through an archway we find a bed of Rhododendrons on our right, backed by a Holly hedge: good plants of R. Loderi, both in the pink and white forms (fig. 100), kewensis, Thomsoni, decorum, Griersonianum (fig. 105), Baileyi, strigillosum, fictolacteum and others. Among these are various Meconopsis, Primulas and Lilies, and Nomocharis pardanthina, which so far have paid no rent! In the centre of this bed is a plant of Magnolia Wilsonii which we grew from seed, and as an experiment, rubbed out all side shoots for the first five years; consequently it is a standard with no branch for 6 feet, and one can look up and see the pendulous flowers to great advantage. This plant fruits freely and every seed germinates. Near to it is a plant of Mr. GERALD LODER'S form of Pieris Forrestii. bed is faced by a Thuya hedge, and passing through a gap we come to a small garden enclosed by Thuya hedges on all four sides. Facing south is a bed of Irises. The centre is composed of a few Prunus Pissardii giving shade to Azaleas, among which are specimens of the grey-leaved form of Drimys Winteri, Magnolia stellata (fig. 104), M. Watsonii, M. Wilsonii, M. glauca, M. parviflora, M. Soulangeana, M. Lennei and M. Thomsonii; the ground is covered with winter Aconites, Daffodils and Leucojum vernum. Here too are two or three standard Wistarias which have been allowed to run riot over the Prunus. The mauve racemes combine well with the purple-bronze leaves of the Prunus. Facing north and east are beds of Primulas, Meconopsis, and Lilies. among the latter a large clump of the best form of $L. \times Dalhansonii$ which I have seen—a bee-fertilized chance seedling. The two best things in the garden last year were in these beds, both Meconopsis, one a plant of Mr. HAY's Nepal M. grandis 41 feet high (figs. 100, 101), with wine-coloured flowers 6½ inches across—the other a bee-crossed hybrid between M. simplicifolia, Bailey's form, and M. betonicifolia, which produced amazingly blue flowers 5\frac{1}{2} inches across (fig. 102).

In the bed facing west are Azara lanceolata, very nearly hardy, and another Azara with larger and rounder leaves which flowers in February and is less hardy, and A. integrifolia, Discarias, Lomatia obliqua, Decaisnea Fargesii, Nothofagus Cunninghamii, and among them Fritillaria obliqua and F. pallidiflora—the latter a far too little grown plant.

Climbing over the hedge is a Clematis whose name I do not know; but it is to all intents and purposes a super C. montana rubra with much larger, deeper coloured flowers.

Leaving the enclosed garden, we come to an Azalea and Daffodil bed on our left, shaded by double-flowered Cherries, Magnolia hypoleuca, a hybrid Medlar and Crataegus, and a Populus lasiocarpa which scatters its cotton-wool covered seeds everywhere, and in some years these germinate freely. On the right of the path are various Rhododendrons, as R. trichocladum, Williamsianum, glaucum, fulgens (the only Rhododendron here whose flowers seem quite frost-proof), discolor, Hodgsoni, fulvum, Falconeri, basilicum, sinogrande, which so far have proved quite hardy. A little further on is a bed of Hydrangea Sargentii and another bed of Rhododendron species, including R. Griffithianum which occasionally flowers (we protect its stem each winter), crassum, orbiculare, didymum, chaetomallum, haematodes, Wardii, semnum, praestans, sanguineum, timetum, and others.

Passing on, we come to a sweep of lawn between two herbaceous borders, 50 yards long by 20 feet wide, backed by Thuya hedges. At the north end of the lawn is the south side of the first-mentioned Yew hedge, at the opposite end is an irregular bed of Iris sibirica in variety, some Iris species, Darwin Tulips, standard Wistarias, Brooms, Halesia carolina (fig. 103), Dipelta floribunda, Acer Pseudoplatanus brilliantissimum, and two Picea pungens glauca. Behind this bed is a grass path linking up with the lawn; behind this again a wide border of shrubs, Halesia and Senecio Grayi encroaching over the path, backed by Acers, Daphnes, Lilacs, Viburnums, etc. This border holds far too many indifferent plants and must be weeded out. Last week I received a letter from the best judge of a plant that I know, one sentence in which struck me as being so true that I repeat it here: "If you take stock of a plant and ask yourself if you notice it and value it when in flower, you find the bulk of your plants are there because you like to have and own 'one of' the plant"! We now turn to the left, and the shrub border continues on our right, where Plagianthus Lyalli and Davidia involucrata are perhaps the most interesting plants, though a group of Laburnum Vossii makes a great splash—Osmanthus Delavayi and O. Forrestii do well here, though the latter has not yet flowered.

At the end of this border we turn right, cross the drive, and go through a gap in the hedge to another Rhododendron bed which runs parallel to the drive. This was originally planted with "garden hybrids" which are gradually giving way to species. One notices R. campanulatum, calophytum, campylocarpum, Fortunei, Souliei, lutescens, callimorphum, oreotrephes, aeruginosum, croceum, eriogynum (full of flower buds this year), etc. Behind these are a quantity of seedlings raised here, mostly crosses between Koster's hybrids and Loderi; they have reached flowering age and some are nice. In this bed is a plant of Magnolia Campbellii. The difficulty here with this plant and some other Magnolias is that, in our dry atmosphere and hot sun, unless the plant is in full shade the leaves and tips of young wood scorch and shrivel with an hour's exposure to mid-day sun, and if one has not got a sheltered north wall it is rather difficult.

Crossing this border, we come to two bays surrounded with Thuyas;

in one grow Cherries and other trees, and among them various Rhododendrons, Magnolia Kobus, M. hypoleuca, M. Thomsonii, Camellia cuspidata, Myrtus apiculata, Eucryphia pinnatifolia, E. Nymansay, and E. cordifolia; the last, though "soft," has stood our last two winters.

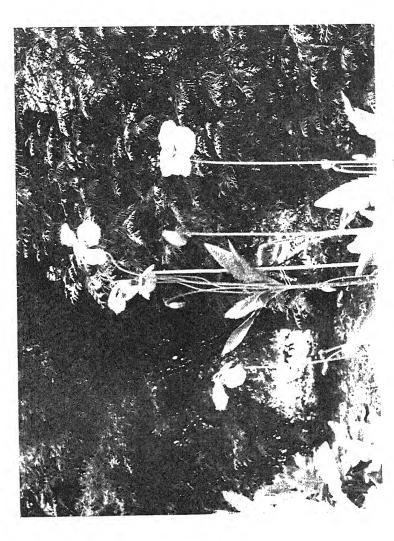
In the other bay are Magnolias acuminata and salicifolia, Rhododendrons Augustinii, cinnabarinum Roylei, dichroanthum, etc., Paulownia imperialis, covered with flower buds which seldom come to anything but which has flowered profusely this year, Hoheria lanceolata, Photinia, Hamamelis mollis and some Syringa species.

Pushing our way through the Thuyas to the east, we come to what was a meadow ten years ago and is now optimistically called the "wood"! It is surrounded on all sides by a belt of conifers and planted all over with trees. The idea was, once shelter and shade had got up, to grow drifts of Rhododendrons, Azaleas, Magnolias, etc.

Some of the trees have reached 25 feet now, the shelter is sufficient, and shade too in places, and we are beginning to get the Rhododendrons and Azaleas in.

The trees are Oaks, Birches, Beech, Poplars in variety, some conifers. Nothofagus procera, N. obliqua, N. antarctica, Aesculus indica, A. californica, Sorbus Aria majestica, S. Vilmorinii, S. Esserteuiana, etc. Plants of Magnolia Kobus var. borealis, M. Wilsonii and M. parviflora are doing well. M. Sargentiana has made a satisfactory start, but commences its growth rather too early for this climate. Pernettyas, Berberis, Cotoneasters, Callicarpa Geraldiana, Fothergilla monticola, two fine plants of both the red and pink berried forms of Euonymus europaeus intermedius, E. alatus and E. latifolius, Cornus florida rubra and Farrar's Viburnum V. betulifolium all make good autumn colour. At the south end of the wood facing north and backed by Scotch firs is a collection of Heaths.

For winter decoration in this district, Iris unguicularis is supreme, producing as it does an endless stream of flowers from November till late March. Among shrubs Hamamelis mollis is outstanding, since frost and snow seem to have no effect on its golden flowers. Viburnum betulifolium retains its berries right through the winter, and birds do not touch them. Prunus subhirtella autumnalis flowers during every mild interval from November till April, provided that bullfinches do not find it! and if one cuts branches in November and brings them into the house they bloom for eight weeks or more.



[To fuce p. 282. Fig. 102.—Meconopsis simplicifolia, Bailey's form \times M. betonicifolia.

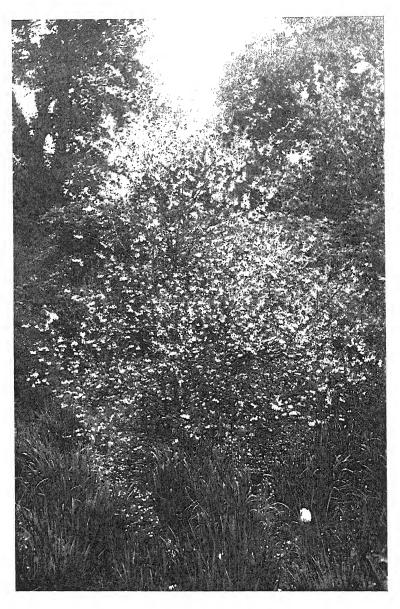
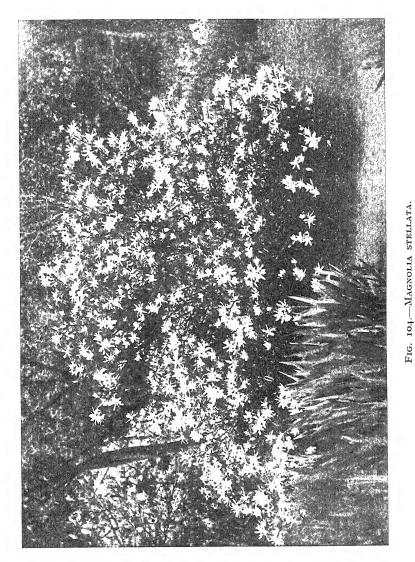


Fig. 103.—Halesia carolina among Tulips and Iris sibirica.



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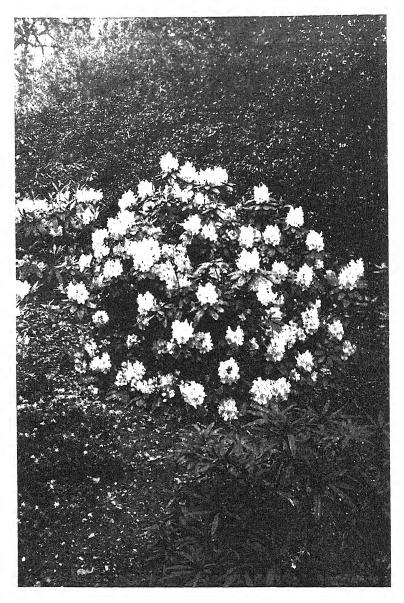


Fig. 105.—Rhododendron 'Loder's White' with R. Griersonianum in foreground.

AURICULAS.

By JAMES DOUGLAS.

[Read April 4, 1934; Mr. R. D. TROTTER in the Chair.]

As you are doubtless aware, it was not originally intended that I should undertake this talk on the Auricula, and that owing to unforeseen circumstances the amateur of Auriculas originally invited has been unable to fulfil his engagement. In the short time at my disposal I have not been able to procure suitable photographs or to develop in a warm house the necessary specimen plants that render a talk of this description so much more intelligible to the listener. We have, however, provided a few specimen plants, and the Royal Horticultural Society has placed at your disposal this case of most interesting and rare volumes dealing with the Auriculas over a period of 300 years.

It is an extraordinary fact that as far as one can ascertain no book or pamphlet on the cult of the florist's Auricula has been published within the last fifty years, and extremely few really good photographs have appeared. The finest coloured illustration in recent years of the florist's Auricula was published by Amateur Gardening some ten or twelve years ago. It represented all types of the Show Auricula and was easily the best modern production in colour. It is also curious that while most flowers in their turn have had their season of popularity, the modest Auricula has been left more or less in the cold. It may be because those who have been associated with the flower in the past half-century were modest, retiring people who failed to realize the importance of "beating the drum." It certainly is not because the Auricula is not a fascinating and beautiful flower or is at all difficult to cultivate, for its needs are few and of the simplest character.

A talk on the florist's Auricula would be incomplete without a few words on the antiquity of the cult. By the courtesy of the Royal Horticultural Society I have been able to collect some interesting facts from works written many years ago by English and continental florists. It is established that continental horticulturists had some knowledge of the Auricula even before Gerard published his Herbal, for Bauhin in his Phytopinax, published in the year 1569, mentions twelve varieties of Auricula ursi, or bear's ears, and in a very interesting work published at Douay in 1616, entitled Jardin d'Hiver, there is a poem in praise of the Auricula, or d'oreilles d'ours as they are called.

MATTHIOLUS, having in view its supposed healing powers and

mountain origin, named it Sanicula alpina; Gesner called it Lunaria arthritica; PARKINSON in his Paradisus, published in 1629, classifies it as a cowslip and says those who have been industrious in sowing seeds of the several sorts, have so succeeded in raising varieties that he would not be able to enumerate them all. He describes, however, twenty-one varieties, and a drawing of one of these, "the greatest faire Bears ears with eyes." This last shows plainly that the florists of the seventeenth century had much improved the flower. Perhaps we might with authority say that the eye or white central disc of paste was at this time developed. If one can form any judgment of the sketches given by both GERARD and LYTE, there was certainly a great improvement in size and form between the years 1597 (GERARD) and 1629 (PARKINSON), for the drawings of GERARD portray small flowers with but four pips to each truss, while Parkinson illustrates flowers quite treble the size and trusses bearing as many as thirteen blooms. According to GERARD, the Auricula seems to have suffered from neglect of cultivation in the sixteenth century, but in 1633, when Johnson published his edition of GERARD, he mentions a very great many varieties grown by Mr. TRADESCANT and a Mr. TUGGIE. TRADESCANT had a "fine garden of rare plants" at Lambeth and at the time Johnson wrote was gardener to Charles I. Being a Dutchman, TRADESCANT would doubtless possess that high knowledge of the florist's art for which his countrymen in that day were justly renowned, and there is little doubt that he applied his skill to the hybridizing and improvement of the Auricula. Although at this time the practice of raising Auriculas from seed was common, it was not until later that any attempt was made to fix a standard of excellence. Some such standard appears to have been in existence when JOHN REA published his "Complete Florilege" in the year 1702. After Rea's day the popularity of the Auricula increased greatly. and various rules were published whereby rival flowers might be compared and their relative merits determined. RICHARD BRADLEY, in his New Improvements of Gardening, published in 1718, lays down "a standard of excellence required to be possessed by skilful florists in the growing of an Auricula"; and in 1757 JAMES THOMPSON published in the town of Newcastle a work entitled "The distinguishing properties of a fine Auricula."

From the earliest years of the eighteenth century the cultivation of the Auricula had been diligently followed out by the Lancashire weavers. In the year 1746, at the early age of 15, James Fitton of Middleton began his career as a grower and raiser of show varieties. He died at the good old age of 86, and his son was still cherishing his father's collection at the age of 80 in the year 1857. Auriculagrowing must surely have been a pastime conducive to longevity, for another famous grower, Joe Partington of Middleton, grew and exhibited Auriculas for 71 years, and at the age of 96 was a hale and hearty old man, whose chief delight was to discourse of his victories at the shows of half a century before, when, a lad of 16,

he carried off the premier award at Eccles for a variety named 'Victory,' raised by Colonel TAYLOR in the early nineteenth century.

It is remarkable that, in spite of the professed admiration by the large majority of a flower-loving public, so few people seem inclined to venture on the cultivation of the florist's Auricula. Thomas Hogg, schoolmaster and florist, writing over one hundred years ago, prophesies in these words: "Considering the number of years that the Auricula has been cultivated in this country, the varieties are comparatively few, yet from the increasing establishment of flower societies not only in England but in Scotland and Ireland also, we may very fairly expect in the course of time a very considerable accession of new varieties." Thomas Hogg's expectations, if realized, did not extend much longer than his day. For in the last quarter of a century there have been fewer varieties introduced than we find recorded when Thomas Hogg sat down to describe in his inimitable style the beauty and worth of the florist's Auricula of his times.

At this stage a few words may be useful in explanation of the points of a modern Auricula as required by the florist of to-day. There are five types: viz. green-edged, grey-edged, white-edged, self-coloured, and fancies. Then we have the distinct section called Alpine, which again is divided into three types, gold-centred, creamcentred, and white-centred. The truss or compact flower-cluster at the top of the stem should be carried erect on a stalk long enough to stand well up from the centre of the foliage; but at the same time it must not be attenuated. The stalk must be proportionate to the leaf, and the truss and pedicels to them both. This standard applies to all florist's Auriculas. The bloom itself is a different matter, and the standard of perfection even more exacting. I will take the greenedged flower first, and, with the hope of making my explanation quite clear, will divide the bloom itself into four parts:

- 1. The Tube, inside which is grouped the pollen-bearing stamens.
- 2. The Eye, or pure white farina-covered disc.
- 3. The Body, a serrated circle of dense black, radiating into the border or edge.
- 4. The Edge or border—that margin round the edge of the corolla which determines the type, such as green, grey or white, and the colour in the case of a self.

All four parts must be in correct proportion one to another.

After long and careful experiment, I give you the relative proportions of a perfect flower:

The Tube: $\frac{3}{16}$ ths of an inch across. The Eye: $\frac{9}{16}$ ths of an inch across.

Width over all—that is to say, from edge to edge of a flower: $I_{\pi_0}^{\alpha}$ inch.

It will thus be seen that the eye or paste should be three times the width of the tube, and the edge or border, including the body colour, half the width of the paste, measuring from the outside edge of the eye. I may say that the perfectly proportioned flower is rare indeed.

The tube of a green, grey, white or self Auricula must be yellow. The eye or inner circle of paste should be pure white, heavily and smoothly laid on, without the tendency to encroach on to the body colour.

The body colour should be intense black radiating evenly into the green, grey or white of the border a moderate distance only.

In the case of a green-edged Auricula, the colour of the edge should resemble freshly applied green paint, although few do.

The grey-edged Auricula resembles a green in every respect except that the border or edge has the appearance of having had a thin film of farina spread by Nature over the edge or border, imparting a grey appearance to the flower; and as the green-edged vary in shade, so also do the grey-edged, some being of a white-grey and others of a green-grey tint, no particular hue being insisted on by the standard of quality.

A white-edged Auricula resembles a grey-edged except that the edge or border is so heavily covered in farina by Nature that it has the appearance of flour and is, of course, perfectly white.

A self Auricula should possess a yellow tube and an inner circle of smooth white paste. The edge or border may be of black, maroon, scarlet, blue, red or yellow; the colour must be absolutely clear and devoid of even a suspicion of farina.

The flowers or pips, as they are called, of all four types must be perfectly flat and smooth. The number of segments should be six, although sometimes five and sometimes seven are met with. The pin or pistil of every type should be below the base of the stamens, otherwise it is known as a pin-eyed defect and as such worthless from an exhibitor's point of view. Of late years another has been added to the officially recognized classes, that of the fancy. This new-comer can be best described as any variety distinct from the four whose points I have already dealt with.

The florist's Auricula is as readily responsive to simple commonsense methods of cultivation as any other flower in the garden. The family to which it belongs is of mountain origin: therefore it is not difficult to appreciate the fact that Auriculas love a pure cold air best of all, although they have for many years been grown with great success in Sheffield, Manchester and the Midland towns, by such well-known men as the Rev. F. D. Horner of Kirkby Lonsdale, Samuel Barlow, Dr. Hardy and Ben Simonite. In London the Auricula has always done well in spite of prevailing fogs. The finest plants I ever saw of that grand old grey-edged variety 'George Lightbody' were grown at Enfield by Mr. W. B. Cranfield some twenty years ago. They were very much finer than any plants of this variety I have seen grown at Edenside—which is saying quite a lot. And so it will be seen that the florist's Auricula can adapt itself to a diversity of climatic conditions, although I have always found

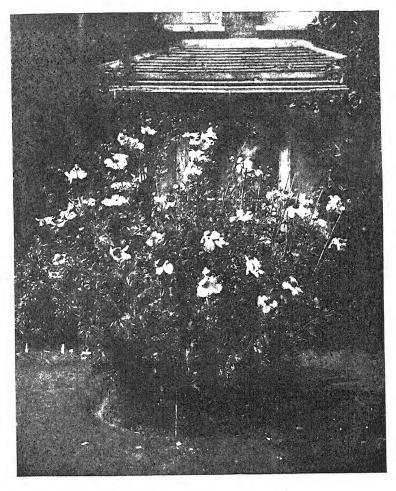


Fig. 106.—Romneya Coulteri at East Dereham.

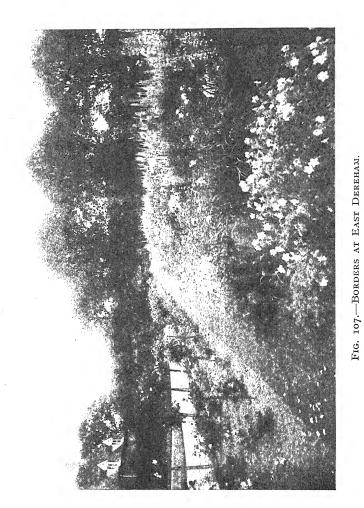


Fig. 108.—Azaleas at East Dereham.

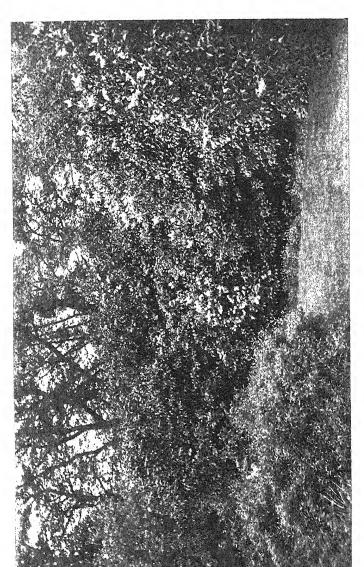


FIG. 109.—LILAC BANK AT EAST DEREHAM.

[To face p. 287.

that it resents a damp, confined atmosphere. Very rarely at any time of the year should the ventilators of the house or frame be entirely closed, even in frosty weather. A prolonged spell of frost may be the means of hastening the decay of the lower leaves, but, after all, this is a natural state, merely the hastening of a normal process, for all Auriculas lose three or four of their leaves at the base of the plant in the winter months. These are quickly replaced as the mild warm days of spring induce young growth to develop from the heart of the plant. The Auricula, although a shade-loving plant like many others of mountain origin, must not be kept entirely from the sun, especially in winter and the early spring days. No sunshine that we are likely to be blessed with up to the 1st of April is likely to distress the plants, nor after the 1st of September should the sunshine available be withheld.

Using a medium fabric, we shade between II A.M. and 5 P.M. (new time) from the 1st of April to the 1st of September. Little water is needed in the winter months—perhaps once a week. In the spring and summer when growth is continually going on, once a day should be enough—but again, "if they need it."

I will now pass as quickly as possible to the important question of compost. If any proof of the hardiness of the florist's Auricula were necessary, I should point to the compost used by ISAAC EMMERTON when George the Third was King. EMMERTON was, I believe, a famous florist of Barnet near London, who flourished some hundred and fifty years ago. In his treatise on the Auricula, published in the year 1819, he advocates a compost which he claims "will cause your Auricula to increase as rapidly as couch grass in the fields"! And here is the remarkable mixture recommended:

- I barrowful of goose dung;
- I do. of sugar baker's scum;
- I do. of night soil;
- r do. of loam.

When we consider that only one-quarter of this fearsome mixture was really a wholesome root-inducing ingredient, one is tempted to remember Prince Henry's words after reading Falstaff's tavern bill: "Monstrous! but one halfpennyworth of bread to this intolerable deal of sack!"

There are, of course, many different composts used to-day. I have had experience with one only, a mixture that has been in use at Edenside for the last forty-five years; it is composed of the following easily procured ingredients:

- I barrow load of fibrous loam torn into small pieces;
- r barrow load of two-year-old leaves riddled through a half-inch sieve:
- I barrow load of rotted horse manure, also riddled.
- To every barrow load of compost add one 5-inch pot of bone meal, one 5-inch pot of coarse sand, and one 5-inch pot of crushed oyster shell.

Nothing else has ever been used to my knowledge in the cultivation of the Auricula at Edenside. People have hinted that there are secrets known only to experts. There are no secrets and no mysterious preparations. All that is necessary to ensure success in the cultivation of the florist's Auricula is fresh air, good loam, and common sense.

The best month for potting is June, although plants can be potted all the year round. A certain amount of care is necessary when watering newly potted Auriculas, for if overwatered they are prone to rot off at the neck. It is a good rule to make sure that freshly potted plants have rooted through to the side of the pot before becoming too lavish with the water can. When potting always contrive that the lower leaves are above the level of the soil, for if the base of the leaf is buried there remains always a risk of the plant rotting off, especially in the winter months, when the lower leaves die off naturally.

The operation of potting is quite a simple matter and, I believe. does not differ from that employed in the potting of the whole Primula family; and it may interest members of the Primula Society to know that we have grown, at various times, nearly every species of Primula most satisfactorily in the compost we used for Auriculas. already suggested that June is the best month to pot Auriculas. In a large collection such as ours, potting extends into the early autumn. We always prefer these later potted specimens, for there is a certain risk to be taken with the early contingent: plants potted in early June often have a tendency to flower prematurely, and nothing is more annoying than to realize that some of your best plants, destined for spring exhibition, have decided to give you a badly developed truss in the autumn. Let us then fix the time for potting our plants as the end of June, and, everything being ready, turn out the largest and best specimen in the collection and examine its roots for Aphis. Where this pest is found the roots must be saturated with pure methylated spirit, applied with an old shaving brush; remove with a pointed stick as much of the old soil as is deemed necessary, repotting firmly and neatly into the new pot, which should be only slightly larger than the old. It is better not to interfere with the bottom of the stem or carrot, unless, as is sometimes the case, decay has taken place at the extreme end; remove all such decayed carrot with a sharp knife, cutting through just above the affected part, afterwards using a dressing of fine powdered charcoal to prevent any further trouble of the same kind. Although it is better to remove as little soil as possible from a healthy plant when repotting takes place, it is advisable, in the case of a plant that for some unknown reason shows signs of ill-health, to wash every particle of soil from the roots. One is then able to make a thorough examination, to remove all signs of decay, to assure oneself that no insect pest is at work, and to renew the old and possibly sour soil with wholesome compost.

There is no doubt a tendency, especially in the case of beginners, to overpot their plants. The smaller the pot a plant can be grown in, the better for that plant, is a good maxim. No definite rule can

be laid down, but the following statement may help to illustrate. In a collection of 100 good healthy plants I should expect to find 20 potted into 5-inch pots, 40 into $4\frac{1}{2}$ -inch, and the other 40 into 4-inch and 3-inch. The largest pot in use at Edenside is the 5-inch, commonly called '48s'.

Top-dressing in spring, or at any other time of year, I have never really deemed necessary. If the loam used is good enough and rich enough to sustain the plant until the potting season comes round, it hardly seems worth while to disturb and perhaps mutilate any young roots that may be running in the soil within an inch or less of the surface. Certainly in the case of a plant that has been loosely potted, and when one is able to press the soil down with ease, top-dressing is beneficial, in fact necessary. Assuming that potting is done firmly and with good compost, such as I have described, top-dressing is unnecessary. In spring a weak solution of sheep or cow manure and soot can be used once a week. Many declare that it is a muchappreciated stimulant; personally I have found, on the few occasions it has been used at Edenside, that the tendency was to promote foliage at the expense of flower. I hope that you will tolerate my frequent reference to our own methods of cultivation, and if I have given you an impression of egotism, my excuse must be that these methods, simple in themselves, have given unfailingly satisfactory results.

I should like to say a few words on the Alpine Auricula as a garden flower. I believe it is generally accepted that the edged and self Auriculas, with their farina-covered leaves and flowers, have been evolved from the alpine species *Primula Auricula*. The Alpine Auricula, devoid as it is of even a suspicion of farina on foliage or flower, conveys an appealing sense of distinction or difference. I have sometimes wondered if this distinct and beautiful garden variety really owed its origin to *P. pubescens*, and not to *P. Auricula* as generally supposed.

As a garden flower the Alpine Auricula has a special value, for it will grow exceedingly well if planted in a border facing either east or south-east—in fact, it will flourish in any position where partial shade can be obtained. It is a really hardy garden plant, and thrives in a medium clay loam with a moist subsoil in summer.

No other garden plant has that peculiar distinct tint of crimson maroon and blood red shaded maroon, the lovely lilac and purplemaroon tinted colours.

Although the Alpine Auricula fully appreciates shade or semishade, it can adapt itself to a sunny position in the garden, for I have seen it growing to perfection on a rockwork in full sun, when watered morning and evening with a spray.

When preparing a border or a rock pocket for Auriculas, it is a good plan to work in some leaf soil, for this is greatly appreciated by all types of the florist's Auricula. And a little soot placed round each plant will discourage the attentions of slugs.

There is nothing in floriculture more fascinating than the production of something new. The Auricula provides endless fields for experiment and pleasure for the interested amateur who desires to raise new varieties, from seed, carefully hybridized and saved from his own plants.

The act of hybridizing is a simple operation. What varieties to hybridize, time and experience alone can disclose: knowledge will surely come to those who exercise patience and are prepared to take failures and successes together, for the two are inseparable.

The best time to look for the necessary pollen is usually at mid-day. Having decided to use the pollen of a certain variety, select the variety that you wish to hybridize: remove the stamens from the inside of the tube with a pair of surgical tweezers—this should be done before they burst and emit their pollen, otherwise your flower will become self-fertilized if it falls down the tube on to the pistil; take a small quantity of pollen on a camel-hair brush, and place it on the pistil of the flower from which you have taken away the stamens: if the pistil is properly developed and has a clean, glutinous appearance, the plant will be hybridized and in due course bear seed.

Auricula seed can be sown at any time of the year. Perhaps the best time is in the month of February, especially if it can be germinated in a warm house, pricked out at once and placed in a cold greenhouse or even a "cold frame." If sown in a cold greenhouse or frame the seed will germinate quite well, but much more slowly. Auricula seed is small and easily buried for ever, if care is not taken to cover it very lightly with fine sandy soil. The following method of sowing is both safe and efficient: Fill a seed pan with sandy loam, level it carefully before sowing the seed. The most important thing to be observed is the covering of the seed lightly and evenly with soil: this is best effected by sifting it through a fine sieve until the seed is just covered. Germination is often slow and intermittent: the first seeds may appear in ten days and the last in eighteen months. I usually keep my seed pans for two years before despairing of late arrivals. This tardy germination is, I believe, characteristic of many of the Primula family. I find it a great aid to germination if a piece of glass is placed over the seed pan for the first three weeks.

The seed pans do not need shading from the sun until April. For, contrary to the general belief, young seedling Auriculas can stand more sun than adult plants—indeed, I always think that a certain amount of sunshine assists germination considerably, up to the end of March, and as long as the seed or the young seedlings be kept moderately moist I am certain that sunshine is most beneficial.

When the youngsters develop from two to four leaves, prick them off into 5-inch pots, twenty in each pot, still using the sandy compost advocated for the seed pans.

Propagation of established varieties is by offsets, removed from the parent plant usually when potting takes place in June and July. Although unrooted offsets can be taken off and established, it is far

better to wait until a few roots make their appearance: the rooting can easily be ascertained by digging round the neck of the plant with the knife intended to perform the operation.

Remove the selected offset by a clean cut, afterwards applying to the raw surfaces finely powdered charcoal. I have found this a most efficient antiseptic, and use it on every necessary occasion.

The offsets can be planted round the edge of a 3-inch pot, four or five to each pot, using a compost of one part loam, one part fine leaf soil, and one part coarse sand.

MASTERS LECTURES, 1933.

PLANTS IN RELATION TO LIGHT AND TEMPERATURE.

By V. H. BLACKMAN, F.R.S.

PART II.—EFFECTS OF TEMPERATURE.

[Read July 19, 1933; Sir Arthur Hill, D.Sc., F.R.S., in the Chair.]

TEMPERATURE is, of course, one of the main factors which control the distribution of plants on the earth's surface. In this respect it ranks

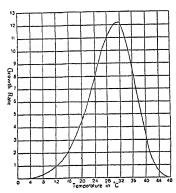


Fig. 110.—Growth of Maize seedlings at different temperatures.

below water-supply but is more important than light, of which the intensity is very commonly in excess. Everyone is familiar with the fact that there is commonly a more or less restricted range of temperature within which plants can live. Above a certain level plants are killed by excess of heat, but this is much higher than that at which satisfactory growth is achieved. At low temperatures there is no growth or germination, and at still lower levels the plant is killed. Certain plants such as bacteria are very resistant to the action of low temperatures and

are not killed even if exposed to liquid air. This resistance is probably related to their very small size. Even ordinary plants are not frozen at the ordinary freezing point (0° C. = 32° F.). The substances (sugars, salts, etc.) dissolved in the cell-sap lower its freezing point below that of water, and the small size of the chambers (cells, wood vessels, etc.) in which the sap is contained is also inimical to the formation of ice. A number of plants are able to carry on various life processes and to grow at temperatures about freezing point. It must, however, be borne in mind that the respiration of the plant produces heat as well as carbon dioxide, so that if heat loss is not very rapid the plant may be at a temperature slightly higher than that of its surroundings.

When considering the effect of temperature upon a plant or upon plant processes, it is usual to speak of a minimum, optimum, and maximum. The optimum is the temperature at which the plant is supposed to grow best, and the others are assumed to represent the lowest and the highest temperatures at which the plant will grow at all. These standards of temperature have, however, no very exact purport. In

considering the effect of temperature the time of exposure must be regarded. A high or low temperature which has little effect at first may after a time prove injurious. A curve showing graphically the rate of growth of seedlings of Maize at different temperatures is given in fig. 110. It will be seen that the optimum there shown is about 32° C. (87.5° F.) and the minimum and maximum at about 4° (39° F.) and 47° (116.5° F.). The results only apply for the particular period during which the rate of growth was observed. This relationship between temperature and time is well brought out in the table given below, in which the optimum temperature for the rate of growth of the roots of cress seedlings is given.

Roots of Garden Cress.

Optimum temperature and time of exposure.

```
3°5 hours . . . . 3°° C. (86° F.)
7 ,, . . . . 2°° C. (84° F.)
14 ,, . . . . . . 27°2° C. (81° F.)
```

If the period of exposure was three and a half hours at the different temperatures, the optimum was found to be at 30° C. With longer periods the optimum is less, and at 14 hours is only 27·2° C. This brings out clearly the fact that these so-called optimum temperatures may really be injurious, but the harmful effect naturally takes time to show itself.

The optimum temperature is incapable of exact definition, since it depends not only on time of exposure but also on the action of other factors—the interrelationship of factors already referred to. The interrelationship of temperature and light is shown in the table below, which gives the relative rate of growth (based on the time taken to double the frond number) of Duckweed (*Lemna*) exposed to different temperatures and different light intensities. It is seen that with increase in the light intensity to which the plants are exposed the most favourable temperature shifts to a higher level.

Duckweed (Lemna).

Effect of varying Light and Temperature.

Relative rate of growth in arbitrary units.

```
350 750 1000 1400 foot-candles
15° C. . . . 1 · 0 1 · 5 1 · 4 1 · 3
22 · 5° C. . . . 2 · 9 3 · 1 3 · 3 2 · 6
25° C. . . . 3 · 0 3 · 8 4 · 0 4 · 2
30° C. . . . 3 · 0 4 · 1 4 · 4 4 · 0
```

Such effects are still more marked with young tomato plants in glasshouses; as the light intensity increases with the advancing season the most suitable temperature also advances. One may say generally that if other conditions are favourable a rise of temperature of 10° C. (18° F.) will increase the rate of growth and the rate of many other plant processes by two to three times.

The effects of temperature on plants are so numerous that only a few special cases can be considered. Reference may first be made to the remarkable effect of exposure to different temperatures on the later flowering and fruiting of certain plants. This effect was first brought to light by experiments with certain agricultural crops. is well known that if winter cereals are sown in spring they usually fail to "head" that season and give no crop, thus differing markedly from spring varieties. It was shown by Gassner about sixteen years ago that this was largely an effect of temperature, for if the winter varieties are exposed during germination to temperatures a little above freezing point they can be planted quite late without undue delay in flowering. The low temperature during the early stages of growth—at the time when the rudiments of the flower have not even been laid down at the stem apex—has in some way affected the plant so that normal flowering and fruiting are achieved much earlier. It is a kind of predetermination, the earlier exposure to a low temperature determining the later flowering and fruiting, though we do not know how this is effected.

An example of this effect is shown in some experiments with winter rye carried out at the Imperial College. The only difference between the plants seen in the photograph (fig. II2) is that those on the left were exposed during germination to a temperature of r°C., those on the right to 18° C. After this the conditions were the same for both sets of plants, yet those which were kept cool during the early stages of growth failed to develop a flowering axis and to bear ears. The cereals are long-day plants, so these pot-cultures were exposed to long days as the label LD indicates. Exposure to short days prevented flowering even in plants exposed to 1° C.

That the effect of the low temperature is to induce "earliness" is shown by the data given in the following table, where the plants have been exposed during germination to temperatures of 15-20° C. and of 2-3° C. and sown at different dates.

Winter Cereals and Temperature of Germination.

Sowing Date.	Date of Ear Ap	Days Early.	
	15-20° C.	2−3° C.	
	W	heat.	
December 18 March 3 April 15 April 25	June 16 August 13 September 18 no earing	June 9 July 23 August 10 August 11	7 21 39 (infinite)
	I_{i}	?ye.	
January 9	June 2	June 2	0
February 6	June 9	June 9	0
April 15	August 4	June 18	47

As the date of sowing gets later the gain in earliness with "cool" germination gets longer and longer. With winter wheat sown on April 25 there is no "earing" with germination at the higher temperature, so the gain is infinitely large.

This predetermination by temperature, though discovered in 1917, remained until comparatively recently of purely physiological interest. During the last few years, however, botanists in Russia have taken up the study of physiological predetermination and have shown not only that it can be achieved by light as well as by temperature, but also that it can be of practical value in agriculture and horticulture. The work in this field has been published mostly in the Russian language, but a most valuable summary in English has recently appeared (R. O. Whyte and P.S. Hudson, Vernalization: Imperial Bureau of Genetics, Aberystwyth, 1933).

The work has been mostly carried out at the Odessa Plant Breeding Station and a process has been elaborated which is called Jarovizatzia in Russian and may be anglicized as vernalization. The essential discovery is that the exposure to low temperature may be given at a stage as early as that of the swollen but ungerminated grain. Furthermore, the effect persists even if the grain be dried after treatment and planted later. Vernalization is applied on the large scale in the granary in the following way. If wheat is to be treated the grain is spread in heaps and water supplied to an amount sufficient to allow of the water-content reaching 50 per cent. of the dry matter; to secure a rapid absorption of water the temperature should be 10-12° C. The grain is then spread out in layers 8-10 inches deep and kept preferably at 15° C. After a short period all the embryos will have begun to grow and in some grains the young roots will have pierced the coat of the grain. The process of vernalization should then be applied by opening at night the doors and windows of the granary so that the temperature is reduced to 3° C. It is kept at this temperature for 10-15 days and is then ready for sowing. If kept for later sowing it must be dried.

This process of vernalization can of course be applied to autumn cereals in agreement with Gassner's pioneer work, but even with spring wheats it markedly accelerates ear-formation and so secures an earlier harvest. The results with two pure line wheats are shown in the following table.

Pure Line Wheats sown April II.

	Date of Ear Formation.				Days Early	
A. vernalized					June 5	25
A. untreated					July 1	-
B. vernalized					June 12	18
B. untreated					July 1	promitting

Such acceleration of ripening is of great importance in wheat grown in the semi-arid steppes of the Ukraine, since the high summer temperature damages all but early ripening crops. Thus the unvernalized crops, being later, were caught by the droughts of summer and gave very low yields—in the case of A only one-twenty-fourth and in the case of B only one-fourteenth of the treated.

Vernalization by Light Treatment.—The Russian workers have

made a most interesting extension of the work in which predetermination is brought about by heat. The cereals of the temperate zone, such as wheat, barley, oats, and rye, are long-day plants and can be grown under continuous light. Such tropical and sub-tropical plants as sorghum, Sudan grass, millet, maize, and Soya bean require a high temperature and a short daily period of illumination. exposed to continuous illumination or to long days they may fail to flower, and this is a hindrance to the extension of their cultivation to more northern latitudes. It has been found, however, that this difficulty can be overcome, for by suitable treatment the plant can be brought into a physiological condition in which the reproductive phase occurs later irrespective of exposure to short days, in fact it will appear even in continuous light. This physiological condition is brought about by exposure of the swollen seed to a period of darkness at a fairly high temperature. The period of darkness accelerates the onset of the reproductive phase so that during its later growth the plant is largely independent of photoperiodic (i.e. length of day) conditions. In the case of millet the partly moistened seed is kept in the dark for 5 days at a temperature of 25-30° C.; sorghum requires 8-10 days at the same temperature, while maize requires 10-18 days at 20-30° C.

Vernalization of the Potato.—The object of vernalization is to induce an earlier appearance of the reproductive phase. The process might seem of little use in the case of a crop grown not for seed but for some vegetative part. It has been known for some time that length of day affects tuber-formation, and it is claimed that in the potato the production of tubers can be accelerated if the tubers before planting are suspended in the greenhouse and receive normal illumination during the day and electric light of high intensity during the night; the temperature should be 15-20° C. With such treatment the buds grow rapidly, but remain quite short owing to the dryness of the air and to the illumination.

Social Flowering of Plants.—There are a number of cases known, especially in tropical orchids, where in a particular region all the plants flower suddenly on the same day. Dendrobium crumenatum is an example, and has been closely studied in Java. In this plant the flower-buds develop slowly during a long period till they reach an advanced stage, when further development stops. The buds usually remain in the dormant condition for a considerable period and then. suddenly, in the buds of all the plants in that locality development begins again, and the bud matures and the flower unfolds all in a few days. It seemed certain that the sudden burst into activity must be due to some change in the environment of the plants acting as a "trigger-mechanism." In agreement with this view it was shown, first by an English botanist, that the flowering of these orchids occurs g or 10 days after a shower of rain, some other species, however, taking 30 days. It was also shown that the same phenomenon is to be observed in species of Coffea and also in Murraya exotica among the

Rutaceae. Attempts, however, to break the dormancy of the buds by artificial watering were without success. It appeared, then, that the simultaneous quickening of the buds which is responsible for social flowering is some concomitant of heavy rainfall, not the actual wetting. This was confirmed by the fact that orchids protected from wetting in a glasshouse flowered at the same time as their fellows outside. was noticed that a heavy tropical shower often results in a marked lowering of temperature: in Java the fall may be 6-9° C. (II-I6° F.). Accordingly Costers (Ann. Jard. bot. Buitenzorg, 35, 1926) tried the effect of sudden cooling combined with moisture by placing in water at 20° C. for 2-20 hours the aerial parts of the plants bearing the dormant flower buds. The experiment was entirely successful. Fig. 113 shows shoots of the orchid Dendrobium crumenatum after placing in water at 18-20° C. for one and a half hours. On the left is a shoot I day after treatment; the other shoots represent stages 3, 4, 5, 7, and 8 days after treatment, culminating on the extreme right with fully opened flowers, 9 days after treatment. orchid, Thrixspermum arachnites, showed a similar response. Fig. 114 shows shoots (reading from left to right) o to 8 days after treatment. If the shoots were cooled slowly from 30° to 20° C. there was no effect. The effect could be achieved without wetting, for the plants will respond to sudden cooling of the air. Coffee flowers within a week of rain following a period of drought. Here also the buds after reaching a certain stage of development pass into a dormant state from which they are roused by a change in the environment; either wetting or cooling or increased moisture in the soil will act. Murraya exotica flowers about 14 days after a shower, but the effect has not been further analysed.

Temperature and Periodic Changes.—The effect of temperature on the unfolding of buds and the development of flowers—apart from the special cases mentioned above—is, of course, a commonplace in horticulture. In the flowering of perennial plants, such as Tulip, Hyacinth, Lilac, Azalea, Apples, etc., we are dealing with the development of a bud which was formed many months earlier, usually in the previous year. Our knowledge of the effect of temperature on the flowering of such plants is incomplete and one-sided if we are acquainted only with its effect on the unfolding of the bud and the elongation of the flower stalk. For a full picture of the response of the flower to temperature we require a knowledge of its effect on the initiation of the flower bud and the development of its parts before opening. The rapid unfolding of the bud may be the more striking phenomenon, but in physiological importance the period of the constitution and differentiation of the floral organs must take first place.

Until comparatively recently there was little information available as to the effect of temperature on flower-initiation. About 1920, however, Blaauw at Wageningen in Holland began elaborate investigations of the effect of temperature on various stages of the development of the Hyacinth and the Darwin Tulip. The effect of eleven different

temperatures (1.5-35° C.) was studied in relation to the three cardinal stages of these plants, (i) leaf-formation, (ii) formation of the flower. and (iii) the elongation of the floral axis. It was soon evident how different is the temperature response of the last two processes, for in the Darwin Tulip the optimum for flower-building is about 17-20° C., while that for elongation of the flower stalk is at first about 9° C., gradually rising to 20°C. In the Hyacinth the corresponding stages show optima at 25°C. and 13°C. Fig. III shows graphically the effect of temperature on flower formation in these two plants. The roman figures I-VIII represent advancing stages of flower formation in the bulb; at stage I the stem apex is still in the leaf-forming stage, while stage VIII is that of the fully differentiated flower bud. On the base line temperatures (° C.) are shown, and the curved lines show the stage of floral development reached after 4 weeks treatment at each temperature. The striking effect of temperature, as well as the difference between the two plants, are well brought out. The most suitable

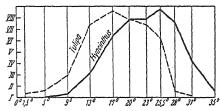


Fig. 111.—Effect of temperature (in °C.) on development of flowers in the bulbs of Tulips and Hyacinths.

temperature for the Tulip lies 4-7° C. lower than that for the Hyacinth.

Using the information of the response of these plants to temperature, Tulips and Hyacinths and plants may be induced to complete their whole life-cycle in 8 to 9 months. It seems, however, that this period cannot be

shortened further, however the external conditions may be manipulated. In these investigations a number of interesting differences between the two plants were brought to light. One of them has been stated; another was the fact that for the Tulip the lower temperature inhibiting growth is $-\mathbf{r}^{\circ}$ C., while for the Hyacinth it is 5° C., as indicated in the diagram. Furthermore, in the Hyacinth the growing point will react immediately to a temperature suitable for flower formation, while in the Tulip flower formation cannot be inaugurated until all the foliage leaves have been laid down. We see how the march of the plant's development is controlled by the cycle of temperature changes.

Of recent years forcing methods have been applied also to Daffodils at the Laboratory for Bulb Investigation, Lisse, Holland. In a Daffodil bulb grown in the open in Holland, the laying down of the floral parts begins early in May, while the normal lifting time is two to two and a half months later. By the middle of June the parts of the flower are complete except for the trumpet. The initiation and development of the Daffodil flower is thus much earlier than in the Tulip, so it is impossible to control the early stages of the floral development by storage conditions. If flower formation is to be hastened it must be done through modification of the conditions of growth. One

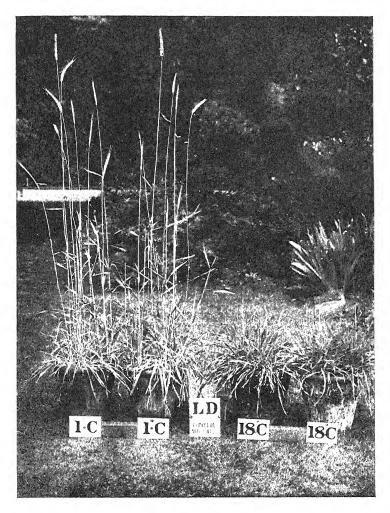


Fig. 112.—Perkins Winter Rye—Effect of Temperature of Germination. The temperatures indicated are those at which the seed was germinated. Subsequent growth was at the same temperature for all.

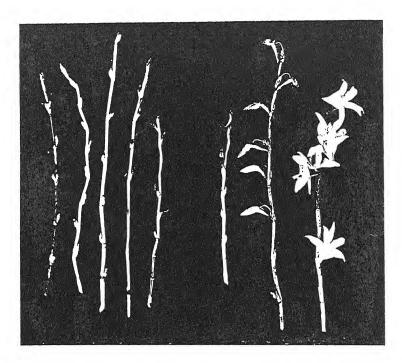


Fig. 113.—Dendrobium Crumenatum. Effect of Sudden Cooling on Flowering.

Daily change in inflorescence after treatment.

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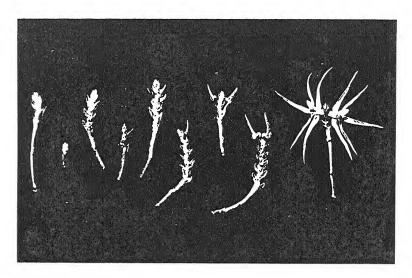


Fig. 114.—The Thrixspermum Arachnites. Effect of Sudden Cooling on Flowering.

Daily change in inflorescence after treatment.

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[To face p. 200.

method is to plant the bulbs in greenhouses or in situations where the warmth of the climate causes an earlier blooming. In the latter case, however, the high temperature at lifting time common in such regions is inimical to early forcing later. Bulbs grown in such regions, if the capacity for early forcing is to be retained, must be stored in cool conditions after lifting. By suitable manipulation of temperature Daffodils may be made to bloom before Christmas. This is brought about by storage at 48° F. from July to November, or storage at 62.5° F. for two weeks and then storage at 48° F.; after boxing they are kept at 48° F. and then brought into the forcing house in late November or early December. The variety Lady Moore began to bloom after 16 days forcing and Early Surprise after 14 days (see I. J. BEYER en E. VAN SLOGTEREN, Vroegbroee van Narcissen: Laboratorium voor Bloem bollenonderzoeh te Lisse, no. 45, 1932; also E. VAN SLOGTEREN, The Early Forcing of Daffodils: Year-book, Royal Horticultural Society, London, 1933, pp. 41-49). These reactions of the Tulip, Hyacinth, and Daffodil are remarkable examples of the control which temperature is able to exert on different stages of the life-cycle of the plant.

Only a very few of the multifarious aspects of the regulation which temperature exerts on the plant's activities have been considered. I should like, however, to end on the note of interaction of factors, i.e. of the interrelationship of the effects of environmental conditions. Light, temperature, air-humidity, soil moisture—all play an important part in the control of the life of the plant, but alteration of one of these will almost certainly affect the action of the others. On this account it has been well said that wise gardeners do not attach too much importance to the natural conditions in which wild plants are found growing. It is usually impossible to reproduce artificially all the conditions of the natural environment, and the alteration of one of them may necessitate the modification of one or more of the others, and so a wide departure from the natural environment.

FRUITS TO WHICH AWARDS HAVE BEEN MADE, 1933.

Pear 'Sir Harry Veitch.' A.M. October 5, 1933. (Received provisional A.M. October 12, 1926.) Raised and exhibited by Messrs. Allgrove, Slough. Parentage—'Thompson's' × 'Josephine de Malines.' A dessert pear for October. The fruit is a little below medium size, coloured light yellowish green and almost covered with thin brown russet. Round, conical, tapering to the short, woody stalk which is set in a small even cavity. The eye is half open and set in a shallow basin. Flesh is firm, juicy, melting and well flavoured. This is regarded as a pear of first-rate quality.

The variety is growing in the trial grounds at Wisley and a complete description and report of growth and cropping will be given in due course.

Plum 'Olympia.' A.M. September 27, 1933. Raised and exhibited by Messrs. Laxton Bros., Bedford. A medium-sized, oval, nearly prune-shaped dessert plum; coloured deep blackish purple and almost covered with pale bloom. The suture is distinct but shallow, and the golden flesh, which clings to the stone, is juicy and sweet. This plum may lack the good appearance usually associated with the best dessert fruits, but its rich flavour and quality is notable.

Plum 'Wierton Gage.' A.M. September 12, 1933. Raised (parentage unknown) and exhibited by Mr. W. H. Divers, V.M.H., Westdean, Hook, near Surbiton. Fruit fairly large, oblong, tapering a little to apex, red, becoming dull deep crimson, skin almost covered with lavender bloom, slightly downy towards apex with many light russet spots and occasional patches of slight russeting. Suture rather shallow. Stalk slender, long, very hairy and inserted in a fairly deep narrow cavity. Pistil in a shallow cleft. Flesh golden. Flavour rich. Stone nearly flat, oval with obtuse ends, free. Shoots markedly downy. Foliage dark glossy green. Leaves of medium size, thick, oval tapering to base, acute, finely and usually doubly serrate-crenate; upper surface smooth and glabrous; lower surface hairy, petiole covered with many hairs.

PLANTS TO WHICH AWARDS HAVE BEEN MADE, 1933-4.

Acacia alata. A.M. January 23, 1934. From the Director, R.H.S. Gardens, Wisley. A shrub for the temperate house, pretty when bearing its fluffy balls of canary-yellow flowers, but otherwise mainly of botanical interest. The slender stem is provided with stipular thorns and a pair of longitudinal green wings. The small leaves, which are continuous with the wings, have each two points, one spine-tipped the other bearing a gland.

Aster novi-belgii 'Charles Wilson.' A.M. October 5, 1933. From Messrs. Wood, Taplow. Flowers bright rose-pink, 1½ inch diameter, disc yellow. The plant is of medium height and branches freely. A seedling from 'Red Rover.'

Arbutus Unedo. F.C.C. November 7, 1933. From Viscountess St. Cyres, Lymington. One of the most handsome of evergreen trees. Its dense, lustrous green foliage is always attractive, but the tree is at its best late in autumn, when it displays its panicles of white or pinkish flowers and orange-red, strawberry-like fruits.

Brassocattleya \times 'Corona.' A.M. November 7, 1933. From Messrs. Black & Flory, Slough. ($C. \times$ 'Corona' $\times B.-c. \times$ 'Ruby.') A pleasing flower with flat sepals and petals of rosy mauve. The spreading labellum has a golden centre and a rose-purple margin.

Brassocattleya × 'Marie-Marie' var. superba. A.M. October 10, 1933. From Mrs. R. Paterson, Ardingly. A charming pale mauve flower, the wide labellum purplish mauve with a golden centre.

Brassolaeliocattleya \times Rotherfield. A.M. September 27, 1933. From Messrs. Stuart Low, Jarvis Brook, Sussex. (B.-l.-c. \times 'Ilene' \times L.-c. \times 'St. Gothard.') A large flower with soft pale yellow sepals and petals, the labellum richer in colour and with a small purple mark near the front.

Calanthe \times 'Hexham Gem' var. 'Dipton.' A.M. January 9, 1934. From Clive Cookson, Esq., Hexham. ('Angela' \times 'Bryan.') Flowers old rose tinged red.

Calanthe × 'Hexham Gem' var. 'Mickley.' F.C.C. January 9, 1934. From Clive Cookson, Esq. Flowers brilliant ruby.

Calanthe × 'Hexham Gem' var. 'The Abbey.' A.M. January 9, 1934. From Clive Cookson, Esq. Flowers crimson, the labellum flushed with ruby.

Camellia japonica var. 'Kimberley.' A.M. February 6, 1934. From the Director, Royal Botanic Gardens, Kew. A very handsome single-flowered Camellia. The medium-sized leaves are deep green and glossy, finely serrate in the upper half and pointed. The flowers are of good texture and open to a shallow saucer-shape. The petals are broadly ovate-oblong, notched at the apex, bright cherry-red set off by the large central cluster of yellow stamens.

Caryopteris × clandonensis. A.M. September 12, 1933. From A. Simmonds, Esq., W. Clandon. A most ornamental late-flowering shrub raised between *C. incana* and *C. mongolica*. The sprays were about eighteen inches long with numerous soft, grey-green, lanceolate leaves, some of which were entire and some coarsely toothed. The deep lavender-blue, fringed flowers are produced in dense, flattened, axillary cymes.

Cassia corymbosa. A.M. October 24, 1933. From Sir Wm. Lawrence, Bt., Burford. A handsome shrub suitable for the cool house or for sheltered situations outside in the west. The bright green leaves have three pairs of oblong-lanceolate leaflets, and the

rounded, golden-yellow flowers are produced freely in axillary and terminal corymbs.

Chrysanthemum 'Avondale Yellow.' A.M. October 10, 1933. From Messrs. Tyson, Crawley. A clear bright yellow decorative variety. The flower is full and of good form with narrow reflexed florets.

Chrysanthemum 'Bar Gold.' A.M. October 24, 1933. From Mr. J. Barrell, Bridgwater. A brilliant buttercup yellow decorative variety of excellent form and substance with broad florets.

Chrysanthemum 'Floodlight.' A.M. October 10, 1933. From Mr. J. Barrell. A canary-yellow decorative variety of good form with flat, pointed florets.

Chrysanthemum 'Graham Luxford.' A.M. November 7, 1933. From Messrs. Luxford, Sawbridgeworth. A large, light yellow Japanese incurved variety of excellent form.

Chrysanthemum 'Ina Cook.' A.M. November 28, 1933. From Mr. C. H. Cook, Windsor. A citron-yellow single variety with several rows of florets. The flowers measure 5 inches across.

Chrysanthemum 'Joseph Bradford.' A.M. October 24, 1933 From Mr. H. Woolman, Birmingham. A large bright rosy-purple incurved Japanese variety with silvery reverse. The florets are broad and of great length, tipped with green.

Chrysanthemum 'Marie de Petris.' A.M. December 12, 1933. From Mr. T. Stevenson, Hillingdon. A bright yellow incurved variety of American origin. The blooms are of good form and substance.

Chrysanthemum 'Opale.' A.M. October 10, 1933. From Messrs. Luxford. A very large Japanese incurved variety with long, curling, pale buff florets having a little pink shading on the reverse.

Chrysanthemum 'Peter John.' A.M. December 12, 1933. From Mr. T. Stevenson. A light pink decorative variety of excellent form. The blooms measure 5 inches across. A sport from 'Colham Pink.'

Chrysanthemum 'Santa Claus.' A.M. December 12, 1933. From Messrs. Tyson. A seedling single variety measuring $4\frac{1}{2}$ inches across. The ray florets, of which there are several rows, are dark crimson and the disc is surrounded by a very narrow yellow zone.

Chrysanthemum 'Snowdonia.' A.M. September 27, 1933. From Messrs. Johnson, Tibshelf. A good white decorative variety with broad florets rounded at the tips; the flowers are of good substance and are borne on long stiff stems.

Chrysanthemum 'William Wigley.' A.M. October 24, 1933. From Mr. H. Woolman. A large white Japanese incurved variety with long, broad, curled florets.

Chrysanthemum 'Windsor Gold.' A.M. November 28, 1933. From Mr. C. H. Cook. A golden-yellow incurved variety of good form and medium size.

Chrysanthemum 'Yellow Beauty.' A.M. September 27, 1933. From Mr. T. Stevenson. A clear yellow decorative variety raised by

Mr. J. Barrell, Bridgwater. The florets are narrow, rolled and slightly twisted.

Colchicum speciosum atro-rubens. A.M. September 27, 1933. From R. B. Trotter, Esq., Leith Vale, Ockley. A very handsome variety. Flowers of medium size, solid texture and good shape, rich purplish-crimson, somewhat lighter inside and extending well down the tube.

Cotoneaster conspicua. A.M. October 10, 1933. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A new species collected by Kingdon Ward (No. 6400). It is a very ornamental shrub of erect habit, and appears to grow freely. The small, bright green leaves resemble those of C. microphylla, but the abundant fruits are larger and of a brighter scarlet colour.

Cotoneaster 'Cornubia.' A.M. November 28, 1933. From Lionel de Rothschild, Esq., Exbury. A vigorous and handsome shrub or small tree apparently related to C. frigida. The branches are long and slender, and those exhibited were well furnished with lateral shoots bent by the great weight of fruit they carried. The large, vermilion berries hang in clusters of fifty or more. The leaves are elliptical or lanceolate, $4\frac{1}{2}$ inches long, glabrous above, pale and sparingly downy beneath.

Crassula lactea. A.M. January 23, 1934. From Mr. T. M. Endean, Laindon. An attractive small South African succulent for the cool house. The flower-stems rise several inches above the foliage, and bear pyramidal panicles of starry, white flowers. The leaves are site, obovate-spathulate, grey-green and fleshy.

Crataegus orientalis. A.M. September 27, 1933. From Viscountess St. Cyres. A small tree with spreading branches. The shortly-stalked, obovate leaves are deeply cut into about seven lobes and are tomentose beneath. The dense corymbs of large white flowers give place to clusters of orange-red fruits, each nearly one inch across.

Crocus Olivieri. A.M. February 6, 1934. From the Hocker Edge Gardens, Cranbrook. A small and pretty species of the Aureus group, found in Greece, Roumelia and Roumania. The plant is very dwarf, the segments of the flower not more than $\mathfrak{1}^1_4$ inch long, but the brilliant orange colour of the flowers and the freedom with which they are produced make this species a desirable one for the alpine house or a sheltered spot in the rock garden.

Cymbidium × 'Charmion.' A.M. February 6, 1934. From E. Kenneth Wilson, Esq., Cannizaro, Wimbledon. (erythrostylum × 'Flamingo.') The general habit shows much of the first-named parent. The well-formed flowers are white, the sepals and petals with slight rose markings, while the labellum is spotted with red.

Cymbidium × 'Pervaneh.' A.M. February 20, 1934. From Messrs. H. G. Alexander, Tetbury. (insigne × 'Flamingo.') Flowers formed, soft pink, the lip marked with a deeper shade.

Cymbidium × 'Pipit' var. 'Gladiolus.' A.M. February 20, 1934. From F. J. Hanbury, Esq., East Grinstead. (Gottianum × 'Miranda.')

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A pleasing hybrid with tawny-yellow flowers shaded with brownish-red. The labellum is yellow, much marked with brown.

Cypripedium × 'Ambition' var. 'Regina.' A.M. November 28, 1933. From Lionel de Rothschild, Esq. (C. × 'Gwen Hannen' × C. Fairrieanum.) This large-flowered hybrid has a round white dorsal sepal, marked with rows of purple spots. The greenish petals are shaded with brown, and in habit take after those of Fairrieanum.

Cypripedium × 'Balbus.' A.M. November 28, 1933. From Lionel de Rothschild, Esq. ('Virgil' × 'Hancar.') In this attractive flower the dorsal sepal is heavily spotted with blackish-purple and margined with white. The petals and labellum are green and brown.

Cypripedium × 'Beersheba.' F.C.C. January 9, 1934. From Lionel de Rothschild, Esq. ('Gwen Hannen' × 'Chardmoore.') One of the largest of Cypripediums. The dorsal sepal is white with a pale green base, while the central area is marked with lines of rose-purple spots. The petals and labellum are greenish, shaded with brown.

Cypripedium \times 'F. C. Puddle,' Bodnant var. F.C.C. September 27, 1933. From the Hon. H. D. McLaren, Bodnant, Tal-y-cafn, N. Wales. ($C. \times$ 'Actaeus' $\times C. \times$ 'Astarte.') Texture of flower thick, form excellent, porcelain-white. A fine variety subsequently awarded the George Moore Medal.

Cypripedium × 'Peter Arnott.' A.M. February 20, 1934. From Messrs. Black & Flory. ('Nena' × 'Gertrude West.') This round flower has the dorsal sepal green at the base and white in the upper part. Petals green and brown with a few blackish spots.

Cypripedium × 'Sheba.' A.M. January 23, 1934. From F. J. Hanbury, Esq. (Parentage unknown.) This is a distinct flower of clear greenish colour; the dorsal sepal is bordered with white, while the petals have a thin median line of brown.

Danae racemosa. A.M. November 7, 1933. From Viscountess St. Cyres. A branching evergreen shrub a yard high. The leaves are reduced to minute scales, and the axillary shoots form rich green, lanceolate cladodes two to four inches long. The small white flowers give place to globose red berries.

Elaeagnus umbellata. A.M. September 27, 1933. From Viscountess Byng of Vimy, Thorpe-le-Soken. A spreading shrub ten or twelve feet in height. The elliptic or ovate leaves, branches, flowers and fruits, are covered with small scaly hairs which give the plant a peculiar silvery appearance. The sprays exhibited bore a large number of ovoid fruits, at first greenish but finally red.

Eriogonum niveum. A.M. September 27, 1933. From T. Hay, Esq., Hyde Park, London. An uncommon herbaceous plant with basal clusters of leaves from which rise slender flowering growths. The small, white flowers grow in sessile groups at intervals on the inflorescences.

Eucryphia Moorei. A.M. September 12, 1933. From the Hon. H. D. McLaren. A choice Australian shrub, hardy only in warm localities. The slender branches bear opposite pairs of pinnate leaves

with narrow-lanceolate leaflets. The axillary, almost sessile, white flowers are fragrant.

Gaultheria codonantha. A.M. November 28, 1933. From Lionel de Rothschild, Esq. A very uncommon species collected by Kingdon Ward and shown under his number 8024. It is of doubtful hardiness, but in a cold house it forms a bush eight feet in height. The long, graceful shoots bear large, ovate-lanceolate, rugose leaves. The leaf-margins are remotely serrate and like the stems bear short brown hairs. The flowers are borne in axillary clusters partially hidden by the leaves. The corolla is $\frac{3}{4}$ inch across, cup-shaped with a lobed margin, of waxy texture and greenish white in colour.

Hypericum elatum, Elstead var. A.M. September 27, 1833. From Mr. E. Ladhams, Elstead. A half-evergreen shrub three feet in height. The leaves are ovate-oblong, two to three inches long, green above and somewhat glaucous beneath. The yellow flowers are arranged in flattish terminal panicles and are followed by red capsules.

Iberis linifolia. A.M. October 24, 1933. From Mrs. Torkington, Maidenhead. An attractive biennial or monocarpic Candytuft which forms a bushy, copiously branched plant eighteen inches high. The leaves are small and narrow, the flowers rosy-lilac, arranged in corymbs at the tips of the branchlets.

Indigofera decora. A.M. September 12, 1933. From C. T. Musgrave, Esq., Hascombe. An uncommon dwarf shrub from China and Japan. The leaves are pinnate with seven to thirteen elliptic leaflets an inch long. The dainty, pink-and-white, Pea-like flowers are carried in long and slender axillary racemes. Often killed back by winter frosts.

Lachenalia pendula. A.M. November 28, 1933. From the Director, The John Innes Horticultural Institution, Merton. A very valuable winter flowering bulbous plant for the cool house. The ample, rich green foliage is exceeded by the erect, spotted scapes, each of which produces about twenty pendent, tubular flowers an inch long. The perianth segments, of which the three inner slightly protrude, are bright vermilion, tipped with green.

Laeliocattleya \times 'Berenice' var. 'Crimson Glory.' A.M. September 27, 1933. From Messrs. H. G. Alexander. (L-c. \times 'Lustre' \times L-c. \times 'Mme. Brasseur Hye.') Sepals and petals rich rose-purple, labellum dark velvety crimson-purple.

Laeliocattleya \times 'Princess Margaret' var. magnifica. F.C.C. October 24, 1933. From Messrs. McBean, Cooksbridge. ($L.-c.\times$ 'Profusion' $\times C.\times$ 'Clotho.') A large and attractive deep mauve flower, the labellum crimson-purple with a cream-white area in the throat.

Laeliocattleya × 'Princess Margaret' var. 'Perfection.' A.M. October 10, 1933. From Messrs. McBean. A large flower of good form, sepals and petals mauve, labellum deep purple, margin frilled.

Malus × zumi. A.M. September 12, 1933. From Lionel de Rothschild, Esq., Exbury. A hybrid Crab-apple, raised from the

cross M. baccata mandshurica \times Sieboldii. It is a tree with ovate-oblong finely-toothed leaves, sometimes lobed on the young shoots. The flowers are pink in the bud, white when fully expanded, and are followed by little rosy fruits $\frac{1}{2}$ inch across.

Miltonia \times 'Bleuarm.' A.M. November 28, 1933. From Mrs. R. Paterson. (M. Bleuana \times M. \times 'T. B. Armstrong.') The large flowers are white, the labellum with broken lines of deep purple and a yellowish base.

Miltonia × 'Christine.' A.M. January 23, 1934. From Messrs. Black & Flory. ('Gertrude West' × 'Lycaena.') An attractive variety in which the broad petals are crimson-red shading to rose. The sepals and labellum are whitish, with a few rose-red markings.

Miltonia \times 'Orissa' var. 'Crimson King.' A.M. January 9, 1934. From Mrs. Robert Paterson. (M. Bleuana \times M. \times 'Beau Brummell.') The flowers are distinguished by their rich ruby-crimson colour, the labellum having a yellowish base.

Odontioda × 'Minos' var. 'Margaret.' F.C.C. November 28, 1933. From L. Wells, Esq., Chiddingfold, Surrey. (Odontioda × 'Lerna' × Odontoglossum × 'Cardinale.') Flowers of medium size, but wholly of blood-crimson colour and with a bright sheen.

Odontioda \times 'Verona.' A.M. February 20, 1934. From Messrs. Charlesworth. (Odontioda \times 'Lydia' \times Odontoglossum crispum.) In this pretty hybrid the sepals and petals are magenta-rose, with bright red markings on the central area. The labellum has a yellow disc.

Odontoglossum erispum var. 'Conchita.' F.C.C. February 6, 1934. From Messrs. Charlesworth. This elegant variety is a home-raised plant with particularly broad petals that are frilled at the margin. The white segments show occasional rose shading, while the base of the labellum is yellow.

Odontoglossum \times 'Eudora,' Clovelly var. A.M. November 7, 1933. From F. Mercer, Esq., Steyning, Sussex. ('Dictune' \times 0. \times 'Serapis.') The spike carried 16 well-formed flowers of rich maroonred colour, with rose markings at the tips of the sepals and petals.

Odontoglossum × mirum var. 'Canary.' A.M. February 6, 1934. From Messrs. McBean. (crispum × Wilckeanum.) This charming hybrid bore a spike of about a dozen flowers, of medium size, but clear-canary yellow in colour.

Polygonum lichiangense. A.M. October 10, 1933. From T. Hay, Esq., Hyde Park, London. A herbaceous perennial two to three feet tall, with ovate, acuminate, dark green leaves which are rugose above and tomentose beneath. The small, white flowers are freely borne in terminal and axillary racemes. This plant came up in soil in which plants of *Primula sonchifolia* were imported from Burma in 1931.

Primula malacoides 'Carmine Pink.' H.C. February 8, 1934. From Mr. A. Dawkins, Chelsea. Plant vigorous, of compact, erect habit, 10–12 inches tall. Foliage medium green. Flower stems erect and closely arranged, 6 to 9 to a plant. Flowers flat, well formed,

r inch diameter, rosy-carmine, eye small, pale yellow. Flowering very freely.

Primula sinensis 'Dazzler.' A.M. February 8, 1934. From Messrs. Hurst, Houndsditch. Plant vigorous, of compact habit, 6 inches tall; foliage of medium size, dark dull green; stems and petioles reddish. Flower spikes, erect, 2 to 3 to a plant, 16 to 20 flowered. Flowers held erect, well formed, 1½ inch diameter, bright glowing salmon-orange, margins broadly crenate; eye small, pale greenish; flowers keep their colour well; flowering very freely.

Rosa multiflora, Lady Grey's Variety. A.M. July 18, 1933. From the Countess Grey, Howick House, Alnwick. This very ornamental variety was raised from seed collected in China by the late Reginald Farrer. It is a shrub of extremely vigorous and free growth. The long growths bear large leaves with usually nine obovate, pubescent leaflets, and the flowers, which are borne in large, flattish panicles, are Apple-blossom pink in the bud stage, but fade to a tinged white when fully open.

Rose 'Christopher Stone.' A.M. September 27, 1933. From Mr. H. Robinson, Hinckley. A very fragrant dark crimson Hybrid Tea variety of good substance with broad petals. It is the result of a cross between R. 'Hortulanus Budde' and R. 'Etoile de Hollande.'

Sambueus velutina. A.M. October 24, 1933. From Viscountess Byng of Vimy. A small Californian tree with slender, downy branchlets, bearing densely pubescent leaves made up of five to seven oblong-lanceolate, toothed, dark green leaflets. The small yellowish flowers are borne in convex five-rayed cymes and are followed by small, blue-black fruits covered with white bloom.

Sophrolaeliocattleya \times 'Albalva,' Stonehurst var. A.M. October 24, 1933. From Mrs. R. Paterson. ($C. \times Hardyana \times S.-l.-c. \times$ 'Isabella.') This distinct hybrid has the sepals and petals bright cerise-salmon, shaded with gold at the base, while the labellum is ruby-purple.

Vuylstekeara \times 'Agatha.' A.M. January 9, 1934. From Messrs. Charlesworth, Hayward's Heath. ($V. \times$ 'Memoria Joseph Charlesworth' \times $O. \times$ 'Imperator.') Flowers dark crimson.

Vuylstekeara \times Averna. A.M. September 12, 1933. From Messrs. Charlesworth. (V. \times 'Rutherford's Sylvia' \times Miltonia \times 'Wm. Pitt.') Sepals and petals rose-crimson, labellum rose, flushed with crimson and shaded with orange at base.

Vuylstekeara \times 'Ephyra.' A.M. February 20, 1934. From Messrs. Charlesworth. (Odontoglossum \times 'Cetus' \times V. \times 'Aspasia.') This immature plant bore a couple of flowers in which the sepals and petals are rich velvety crimson. The labellum is similar in colour, but with irregular white marks.

Vuylstekeara × 'Estella Jewel' var. 'Ruby.' A.M. October 24, 1933. From Messrs. Charlesworth. (Miltonia × 'Wm. Pitt' × Vuylstekeara × 'Aspasia.') Flowers flat, sepals and petals deep ruby-red, labellum with a ruby base and ruby markings over the white apical portion.

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THE AWARD OF GARDEN MERIT.-XXIV.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

179. Erigeron 'Quakeress.' Award of Garden Merit, July 5, 1926.

The Erigerons differ from the Asters by small characters in the fruits and conspicuously by the yellow disc florets being surrounded by several ranks of ray florets instead of by only one. Some of the species are only annual weeds, and some of the showy species are apt to spread unduly unless actively restrained, but several are good border plants calling for little special care, and nothing but ordinary good garden soil.

One of the most satisfactory for the border is Erigeron speciosus, a native of Western North America from British Columbia to Southern Oregon, Idaho and Colorado. We owe it to DAVID DOUGLAS, who collected it in 1826 somewhere in 'California,' possibly near Fort Vancouver, as he mentions a large-flowered Erigeron near there. Seed was raised in the Royal Horticultural Society's Garden at Chiswick, and the resulting plant was figured in the Botanical Register, t. 1577, in 1833 under the name Stenactis speciosa, a name which still persists in some catalogues. E. speciosus is a vigorous perennial with rather broad, flat, entire leaves, glabrous, or nearly so, save for the ciliated margins, from among which many leafy branched stems 18 inches high, bearing numerous large flowers, spring in early summer. The first flowers open in June and they are produced in great numbers through July and August, with others to follow until October. The flowers are large, with about 150 narrow violet rays, much longer than the diameter of the disc. They are useful for cutting, since (unlike many of the Asters) once open the flowers do not close again, and they last well in water.

Erigeron 'Quakeress' appeared as a seedling, presumably from E. speciosus, several years ago in the late Col. Petre's garden at Westwick, Norfolk, possibly crossed with a white variety (or species), for 'Quakeress' has flowers of a softer tint and more rosy than in E. speciosus, and is therefore even more desirable than that fine plant. It is equally free with its flowers, and bears them over the same long season. The habit is perhaps a little less dense than that of E. speciosus, but as with that plant a few twiggy branches thrust early into the clumps help to keep them from looking bedraggled after heavy rain or being battered down by strong winds. The plant is one worthy a place in every border of summer flowers.

^{*} The notes on the first hundred plants to receive the Award of Garden Merit have been collected from our JOURNAL, vols. 47 to 53, and published as a pamphlet, price 1s. For subsequent notes see vol. 54, pp. 218 and 423; 55, pp. 121 and 276; 56, pp. 80 and 245; 57, pp. 65 and 354; 58, pp. 171 and 400; and 59, p. 131.

180. GENISTA CINEREA.

Award of Garden Merit, July 17, 1933.

There are rarely seen two plants universally recognized by botanists as distinct species so similar in their garden value as Genista virgata and G. cinerea. Well may it be asked, as it so often is, How is G. cinerea different from G. virgata? G. virgata received an Award of Garden Merit on July 4, 1923 (see Journal R.H.S., 48, p. 230), and it is fitting that G. cinerea should bear it company in the select list of plants upon which this Award has been bestowed. One is as beautiful in blossom from the middle of June into July as the other, and as desirable, for both are hardy; neither demands very special soil, and though both flourish in the open and return the sun's full spendour, both give a glorious glow of gold in partial shade. It is therefore scarcely necessary to plant both in the same garden, unless one desires to make comparisons of the botanical differences between them.

Both have a greyish appearance when in leaf, owing to the silky hairs that clothe the lower surface of the foliage, and both grow to large bushes 10 feet high and through, though they may be kept smaller by light pruning immediately after flowering. G. cinerea has its flowers somewhat more clustered on the sides of the branches than G. virgata, where they are in racemes about $1\frac{1}{2}$ inch long, and the branches themselves are longer and less twiggy than in G. virgata, but this is perhaps more evident in an old than in a young bush. They are probably geographical races of one species.

G. cinerea is a native of S.W. Europe, where it occurs in the French Alps of Dauphiné, in Provence, and on the Riviera, in Italy, the Pyrenees, and especially in Spain in the Sierra Nevada. It grows wild on dry hillsides, on the margins of woods and between stones and rocks. It is generally much dwarfer in its native home than in the richer soils of our gardens.

BOOK REVIEWS.

"The Stapelieae." By Alain White and Boyd L. Sloane. 4vo. 184 pp. (White and Sloane Stapelia Collection, 1421 Dominion Avenue, Pasadena, California, 1933.) \$ 3.

Those interested in Stapelia and the allied genera, whether botanically or horticulturally, will welcome a new work on the subject. Since the revision of the tribe by Dr. N. E. Brown in 1909 in "Flora Capensis" and Alwin Berger's "Stapelieen und Kleinien," 1910, many new species have been discovered and their descriptions are scattered through various scientific journals, so that an assembling of the known data was needed. This work has been undertaken by Alain White and Boyd L. Sloane, who maintain a very fine collection of these

plants at Pasadena.

"The Stapelieae" deals adequately with the subject; the botanical relationships of the tribe are discussed and cultural notes given, followed by descriptions of all the genera and species (of which there are 300); the descriptions are very clear and readable, and in many cases are accompanied by an illustration. interesting section consists of a series of chronological notes giving details of the working periods of those travellers and collectors who have contributed to our knowledge of the tribe from the days of Justus Heurnius, circa 1630. Further interesting points are dealt with in six appendices, there is a map showing the distribution of the Stapelieae and an index of species and varieties, of synonyms and hybrids, and of botanists to whose work reference has been made.

The authors are to be complimented on having carried out this review in a very thorough manner and on presenting the result in a most attractive form. The 236 illustrations are taken from various sources: the coloured frontispiece is from an aquatint published in London, 1801; several of the early drawings from the Botanical Magazine, Hooker's Icones Plantarum and similar works are reproduced and photographs have been borrowed. These have been supplemented by a very fine series of photographs by Boyd L. Sloane, who is evidently

a master of this art.

The completeness and accuracy with which the descriptions have been collated will ensure that "The Stapelieae" will long remain an important book of reference for those interested in this tribe of curious succulents.

"Daylilies: the Wild Species and Garden Clones, both old and new, of the Genus Hemerocallis." By A. B. Stout. x+119 pp. 8vo. (Macmillan, New York, 1934.) 125. 6d.

This is a welcome addition to the monographs on garden plants, useful alike to those who desire to know something of the botanical characters of the plants

and to those whose only desire is to grow them and to grow the best.

Possibly the name "Daylily" has resulted in these plants being passed over by many, for they are seen too seldom in our gardens. Though the individual flowers are fugitive, yet they are produced in such numbers and over so long a period that they are worth a place in any garden, while their robust habit and the pleasant green of their foliage give them a further claim. Speaking generally, they are easy plants, not that there are wanting species that offer some difficulty in cultivation—some are difficult and quite worth growing for the beauty of the flowers—so even in this genus the gardener whose chief pleasure is in success with contrary plants will find something to occupy him and test his skill in Hemerocallis nana, H. plicata and H. Forrestii, while the gardener whose only concern is the beauty of his plants so long as they "do" well will find a host of good things.

A very large collection of species and varieties has been assembled at Wisley in our Society's Gardens, and they give a good opportunity for comparison and an excellent idea of how well worth while the plants are to grow. Those who plant them should remember that they need a year or two to establish themselves and a fairly moist soil with a certain amount of vegetable matter in it.

Dr. Stout recognizes thirteen species of Daylilies, one or two of which are of recent introduction from Eastern Asia. These species are described in English and their cultural characteristics noted, and they are figured either in black

and white from photographs or by means of coloured plates, of which there are four.

An excellent review of old literature of Hemerocallis (the genus has been in cultivation for about four hundred years) is given, and the story of the raising of hybrids, beginning with Mr. George Yeld's work in 1890, is told, work in which America has taken a share and the author no small part.

Chapter VI deals with the "Horticultural Clones of Daylilies," and it occupies 40 pages, with an alphabetical list of varieties each of which has a paragraph of description and history. The awards made from time to time by our Society

are all taken up.

Most of the illustrations are excellent and the book is well printed and "got up." It is a valuable addition to horticultural literature.

"Landscape Gardening." By Richard Sudell, F.I.L.A., A.R.H.S. 4to. 480 pp. (Ward, Lock, London, 1933.) 215.

Mr. Sudell's book, although hardly likely to rank as a classic, is nevertheless a valuable addition to the existing works on landscape gardening. It deals with the many branches of this complex subject in a thoroughly practical manner, and the advice given is, on the whole, very sound.

It puts forward convincing arguments as to the advantages of employing a qualified landscape architect and explains in detail the exact function of the landscape architect as well as the proper way to set about garden construction or alterations out of doors, which is little understood by the public in general.

That the author is fully alive to the needs of the present day is evidenced by the informative chapters on Roof Gardens, Airports, and Hotel and Factory

Gardens.

Following on an introduction by the late Sir William Lawrence, Bt., the volume opens with a concise outline of the history of the English garden by the late Mr. Thomas H. Mawson, in which, however, some mention might have been made of Lancelot ("Capability") Brown, whose influence, good or bad, upon English gardens was considerable.

Not the least valuable part of the book is the chapter contributed by Mr. Gilbert Jenkins on landscape architecture in relation to estate development, which deals with some of the broader aspects of the landscape architect's work. It shows how the employment of a competent landscape architect can have a most beneficial effect in town and estate development, and points out how he might be used to control the activities of the greedy speculative builder and thus check the spoliation of the countryside.

In addition to Mr. Jenkins's contribution, there is a section dealing with gardens of other nations and written by garden architects either residing in or

having special knowledge of the gardens of the country concerned.

Some useful lists of trees, shrubs and flowers for special purposes are incorporated in the book, but the list entitled "Some uncommon perennials," in which are included comparatively familiar plants such as Sidalcea, Polemonium (' Jacob's Ladder '), and Primulas (unspecified), might have been headed more aptly. Few gardeners, also, will agree with the statement in the section on soil, that "peat is really the only medium for the successful cultivation of such subjects as Rhododendrons, Azaleas, Heaths, etc."

A feature of the book is the large number of excellent reproductions of garden photographs and plans, of which over three hundred are included. While in some cases the design is over-mechanical and fails to exemplify the principles laid down by the author, the majority are interesting examples of good planning.

Altogether it is a book which should be of value and appeal to all persons interested in the design and use of outdoor spaces.

"Earnest Earth." By Elsie Grey Turner. 8vo. 287 pp. (Jenkins, 8s. 6d. net. London, 1933.)

The writing of this book evidently gave as much pleasure as the making of the garden had done previously. There is, however, often a danger in being able to write so easily that leads to the inclusion of too much that is trivial and of personal interest, and too little care and time being spent in mastering facts that would make the information accurate and useful to a reader. Thus there is much ado about the difficulty of bringing plants from abroad into England, but no mention of the correct method of obtaining a permit to do so.

Ladies who write chatty gardening books should keep a book of reference at their elbow, such as Johnson's Gardeners' Dictionary, and check their wild usage of capital letters and scientific names, saving us such shocks as tulip Clusiana, Yellow Pyrenaicum, blue camassia, the Quamash, the Tigrinium

splendens or the Japonica. One of them might some day learn that Aubrietia needs the first "i" they so constantly omit. In this book Cypress is used as though it were plural and Gladioli as though singular. We are told not to pronounce the central "i" long, but are not reassured that the author does not so accent the following "o." She owns to "a suspicion that much must already have been written about rock gardens." Suspicion having failed to reach realization may account for "Aubretia."

The best chapter is the last. It is pleasantly gossipy and contains some

clever character sketches: that on animal life is not so successful. The habits of the birds described are too well known for so much commonplace detail. Perhaps the "Giant Woodpeckers" and the heron "that looks like a huge stork" would be more impressive if their exact measurements were given and proved them to be really of an outsize; and it would be far more exciting if the small birds could have been declared to talk like parrots instead of the statement, "They never say 'How late you are!"

Many of the illustrations are good, especially those of the stream. Others justify the friend who foresaw the need for much clearing in the near future.

"Garden History of Georgia, 1733-1933." By L. M. Cooney. Ed. by H. C. Rainwater. 4to. [20] + 458 pp. (Peachtree Garden Club, Atlanta, Ga., 1933.)

The founding of the Georgia Colony in 1733, and the memory of the men and women who have been concerned in its progress and development, have, in 1933, been the occasion of prolonged celebrations, and one of the tangible results is

this interesting, well-written, and well-illustrated volume.

The garden history of Georgia goes back to 1566 or thereabouts, but the concern of the authors has been to trace the history more closely from 1733, when the colony was formally founded. One of the warmer States, at any rate in its southern part, Georgia has enjoyed an opportunity for the planting of broadleaved evergreens denied to States farther north, and the early settlers made good use of their chances, as is evident in the gardens of the State to-day. The presence of Lagerstroemia indica, Michelia fuscata, Pittosporum Tobira, Tea, and Cinnamomum Camphora gives a measure of the climate.

The first one hundred and thirty-eight pages are occupied with gardens that date back from 1863. The remainder is occupied by an account with illustrations of modern gardens, the treatment being to give brief descriptions of the inception of the garden and its chief features, and two or three illustrations of the plantings

that have been made.

The influence has generally been English, though here and there Dutch, Italian and Spanish features are evident, as indeed they often are in our own gardens, but in many the freedom with which Agaves and Palms grow gives a note unfamiliar to our eyes, but none the less very charming.

"Landscape and Garden." Edited by R. Sudell. Large 8vo. 72 pp. (Landscape and Garden, London, 1934.) 2s. 6d. net.

This is a new quarterly magazine devoted to landscape gardening and issued under the auspices of the Institute of Landscape Architects. Of the 72 pages about 24 are devoted to advertisements, the remainder to articles and illustrations. The articles deal with various aspects of design and garden construction, the care and treatment of trees, and the choice of shrubs and so on. The magazine therefore appeals to a wider public than that merely concerned with the laying out of a new garden, though mainly to them. Others will gather useful hints on possible alterations and developments in the garden already made. The study of the numerous illustrations will help in this direction.

"Virus Diseases of Plants." By John Grainger. 8vo. viii + 104 pp. (Oxford University Press, London, 1934.) 6s. net.

The author has prepared in a concise form an up-to-date account of the virus diseases of plants, to which is appended a bibliography of 445 titles. Whether virus diseases are actually more prevalent than formerly, or whether we have been educated to perceive them more readily, it is not easy to say, but it is certainly a fact that this group of maladies claims every year increasing attention by the plant pathologist. Possibly modern methods of propagation have widely distributed infected stocks.

This little volume can be commended to every virus disease teacher and investigator, but being very condensed and somewhat academic in outlook, it is hardly so serviceable for the practical horticulturist.

"Lilacs in My Garden." By Alice Harding. 8vo. viii + 88 pp. (Macmillan, New York, 1933.) 7s. 6d. net.

Bearing in mind the undoubted affinity between the floras of Eastern Asia and the Eastern States of North America, it is somewhat surprising, in view of the number of species of Syringa native of the former that none is indigenous to the latter large region. Nevertheless, as might be expected, over a large area of North America, Lilacs find a congenial home, the climatic conditions being of the type suited to their requirements.

It is not surprising, therefore, that the Lilac should figure prominently in the literature of North American horticulture. Mrs. Harding's "practical handbook" follows close upon the heels of "Lilac Culture," by John C. Wister, published in 1930, and covers much the same ground. The advice given on planting, pruning, manuring, etc., is sound, and is in many ways a repetition of that already given by Wister, and by Wilson in his chapter on Lilacs in "Aristocrats of the Garden." This subject is also dealt with at some length in Bailey's "Standard Cyclopedia of Horticulture."

After giving a brief account of the history and development of the Lilac, Mrs. Harding, in her "Lilacs in My Garden," gives descriptions of a selection of the "French" Lilacs. Of the 200 or so named sorts she has chosen 57, and of these she tells us "There is not one without which I would willingly live."

No fewer than three chapters are devoted to propagation, and the arguments for and against "own root" Lilacs. The chapter on "Ills and Enemies" may be read by gardeners in this country with the comfortable assurance that the more serious troubles that beset the grower of these favourite shrubs in North America are confined to that side of the Atlantic.

Well conceived and well executed, this little book will be found to be instructive to most professional as well as to most amateur gardeners; and it is a pity that the publishers have not seen their way clear to issue it at a more popular price.

E. L. H.

"Arachnoidiscus." By N. E. Brown, S.Dc., A.L.S. 8vo. 88 pp. (Watson, London, 1933.) 6s.

An account fully illustrated of the diatoms of the genus Arachnoidiscus, from the pen of one who has made the discrimination of species of higher plants his life work.

"The Experimental Production and the Diagnosis of Frost Injury on Forest Trees." By W. R. Day and T. R. Pearce. la. 8vo. 6o pp. (Clarendon Press, Oxford, 1934.) 6s. paper covers.

This is No. 16 of the Oxford Forestry Memoirs and is a very useful addition, admirably illustrated, to the literature on frost damage to young trees important in British forestry. It is a record of careful work which will enable distinctions to be made between damage due to frost and that caused by other agents.

The trees dealt with are Larch (Larix decidua, L. Kaempferi and L. sibirica), Pinus sylvestris, Sitka spruce (Picea sitchensis), Norway spruce (P. Abies), Douglas fir (Pseudotsuga taxifolia and P. glauca), Thuja plicata, Beech (Fagus sylvatica), Oak (Quercus Robur and Q. sessiliflora).

"British Wild Flowers" and "British Trees." Folio sheets. 4 series. 32 + 32 + 32 + 32 pp. (Lutterworth Press, London, n.d. [1933.]) 3s. 6d. each series.

This is a series of pictures in colour and of corresponding diagrams in black and white. The first two series show wild flowers (135 species in all) on 32 colour plates which are described as beautiful (which they are not, being poorly coloured and often poorly drawn), and of 32 pages of detailed diagrams which are much better. Common plants are dealt with.

The series (2) of British trees is more true to nature in drawing and colours. Not quite all are British trees (although so entitled), for the Robinia and Araucaria are included.

"Fruit Production: Soft Fruits." Ed. 2 8vo. v + 63 pp. (H.M. Stationery Office, London, 1934.) 1s. net. Paper covers.

This is one of the useful Bulletins (Bull. No. 4) published by the Ministry of Agriculture with the object of aiding growers and bringing before them the latest information on commercial crops. It deals with Strawberries, Gooseberries, Currants, Loganberries, Raspberries, Blackberries, Dewberries, Figs and Melons. The commonly used methods of cultivation are described, notes upon the nature, season and behaviour of the principal commercial varieties are given, and upon

the methods of marketing, and the fungi and insects which attack them. Frequent reference is made to other available Bulletins dealing with the various aspects of the cultivation of the crops referred to.

Nuts were dealt with in the first edition of this Bulletin, but find no place in

this, the intention being to issue a separate Bulletin dealing with these fruits.

"Children and Gardens." By G. Jekyll. New Ed. 8vo. xxiii + 110 pp. 5s. net. (Country Life, London, 1933.)

The text is a reprint of the original edition published in 1908 and reviewed in our Journal then; some of the illustrations are new and there is an introduction by Bernard Darwin. This is a charming book by one who understood children, though few perhaps can enjoy all the pleasures the environment of its author's childhood made possible.

"Gardens of Delight." By Eleanour Sinclair Rohde. 8vo. xii + 308 pp. (Medici Society, London, 1934.)

The author of this book needs no introduction to our readers. By both her lectures and articles she is well known, and her knowledge and love for old books

on gardening have been passed on to the enjoyment of many.

The present book incorporates many of the author's articles from the Field, the Queen and My Garden. It is arranged in twelve chapters, each headed by the name of a month. In the main the writing is round the plants in season, but the author does not slavishly follow this rule, nor, we suppose, does she expect her readers to look in the month for all the plants she mentions.

That it is pleasantly written goes without saying. That it is adorned with knowledge culled from writers of hundreds of years past also goes without saying, but this knowledge is used, for the most part, to illuminate more recent things, and notes upon shows just past and upon plants and gardens of the present form

the main theme.

It would be easy to find fault. Perhaps the make-up of the book itself entails a certain amount of repetition; and possibly lack of time has caused a plentiful crop of wrongly spelt names to pass correction—for many such appear both in the text and in the index—but the book is doubtless meant rather to interest than to instruct, and this it will do both by what it tells as well as the way the tale is told and by the excellent photographs that illustrate it.

We would plead, however, for consideration for the non-botanical reader who may well be left wondering what the "A" and the "V" on p. 253 stand for, and who, having heard by what barbarous names botanists designate plants, may think there really is a beautiful winter-flowering shrub called *Berberis hyemalis*

syn. japonica var. Bealii.

"A List of the More Important Collections in the University Herbarium, Cambridge." By J. S. L. Gilmour and T. G. Tutin. 8vo. 40 pp. (University Press, Cambridge, 1933.) Paper covers.

A brief sketch of the history of the Cambridge University Herbarium is followed by the matter indicated in the title, making a useful list showing where various specimens are to be found.

"Some other Friendly Trees." By Barbara Briggs. la. 8vo. 126 pp. (Lutterworth Press, London, 1934.) 8s. 6d.

The first volume of this series was reviewed in our Journal 57, p. 429, when it appeared. A further series of trees is illustrated here in colour, with excellent black and white details. What was said of the first volume, that it "would make an excellent present for a child," can be said with equal truth of this, for the language in which it is written is clear and simple and interesting.

"A Manual of the Timbers of the World, their Characteristics and Uses." By Alexander L. Howard. (Macmillan & Co., Ltd., London, 1934.) 36s.

In the introduction to the new edition of this well-known book the author makes a plea that information concerning trees and forests should be more generally taught, in order that future generations may be brought more fully to realize the commercial value of timber as well as of the beauty of forests. This, however, bears no particular relation to the bulk of the text, which consists of an alphabetical list (in which the trade and scientific names are intermixed) of the timbers that are most frequently met with in commerce, with notes on the source, appearance and uses of each. The extent of the information concerning each of the timbers dealt with varies from a few lines to several pages according to its commercial importance. At the end of the book there are lists of the various timbers according to the country of origin of each of them, followed by separate indexes to the scientific and vernacular names, as well as a general index.

As is to be expected in a book written by one having a long practical experience of the timber trade, a great deal of valuable and interesting information has been collected together and made readily available to all who are interested in timbers and, more especially, in their commercial uses. From the scientific and botanical points of view, however, there are certain features of the work which are less satisfactory. For instance, it is open to question whether the alphabetical arrangement in its present form is the best that could have been adopted. From the scientific point of view it is unsatisfactory that members of natural botanical groups should be described in different parts of the book, or that an isolated and quite unrelated species should be described between different species within a genus. There are numerous examples of both these peculiarities, as, for instance, when species of *Dipterocarpus* are described under different headings on pp. 25, 151-3, 170-4, 206-8, and 578, or when 'Maple Silkwood' (*Flindersia*) is placed between 'Maple, Japanese' and 'Maple, vine or dwarf,' both of which belong to the genus *Acer* (p. 312). To those whose interest both of which belong to the genus Acer (p. 312). To those whose interest in timbers is mainly commercial, and to whom the botanical status of the trees producing them is of secondary importance, this defect may not appear to be very serious, but it might well lead to much confusion amongst students and others whose first approach to the subject of timbers is along botanical lines. Some of the scientific names adopted, moreover, are not those which are generally accepted by botanists at the present time, e.g. Santalum cygnorum Miq. for the sandalwood of Western Australia. In some instances scientific names have been given without the authority.

It is well known that the multiplication of trade names of timbers, which Mr. Howard himself, at least in certain instances, appears to deprecate (e.g. p. 26), has in the past led to great confusion. It is therefore rather startling in these days, when efforts are being made to remedy this defect, to read on p. 551 that "the Forestry Service of any country might congratulate its officers if they were able to show ingenuity by giving a name to the timber (in this instance 'Tupelo') which would bring it into popularity and use." Practices of this kind in the past have been one of the main causes whereby misleading names have been applied to timbers, thus causing the confusion which is so much deplored. However desirable it may be to encourage the commercial exploitation of little known timbers, it is surely preferable that they should be put on the market under distinctive rather than misleading names.

In spite of the various points, however, that have been criticized, this book, on account of the mass of information that has been brought together and made readily available within the compass of a single volume, should be found very valuable by all who are interested in timbers.

C. R. M.

"The Owner Gardener." By Sir Edward Anson, Bt. 8vo. 276 pp. (John Murray, London, 1934.) 7s. 6d.

Sir Edward Anson has written a book which aims at providing the beginner with a simple introduction to gardening—he has well fulfilled his main object. Throughout he has avoided the use of the hackneyed expressions so freely used by less skilful writers on elementary gardening, and for this reason (amongst others) this text can be read with pleasure.

The early chapters are concerned with the simple tools of the garden and

The recommendations for the treatment of soils are simple and clear. It is a pity, however, that in dealing with the liming of clay he omits any mention of the quantities of lime likely to be necessary. In treating sandy soil it is more usual to recommend powdered chalk than lime.

Chapter V deals with the kitchen garden, and here the author shows the uninitiated how to grow the commoner vegetables successfully. He refrains from mentioning many varieties by name but classifies his plants according to their season and behaviour. The details of planting in the form of a chart should be a handy reference for those desiring to know when to plant and how to space common vegetables.

Subsequent sections are concerned with fruit. The author includes some brief instructions on the formation of the tree, on pruning and cleaning and planting, both bush and stone fruit, but detailed pruning diagrams are absent. Sprays are mentioned and prescriptions given for their preparation. It would have been perhaps as well to include a spraying calendar for apples and pears and some of the bush fruits. The author again restricts his choice of varieties to well-known standard kinds. He omits from his list of reliable varieties such a favourite as Cox's Orange Pippin.

Dealing with shrubs and trees he again gives a thoroughly sound introduction to their cultivation, and once more refrains from overburdening his text with many names of species and varieties.

Chapter VII includes information concerning most of our common bulbous plants. In the space of such a small book no one can deal with all the species, nor mention varieties, many of which can now be purchased so cheaply. perhaps a pity that he refrains from mentioning the diseases to which these plants are subject, for it should be clearly impressed on the purchaser of bulbs such as those of Lilium auratum that he may have to destroy many plants infected with the virus diseases.

A small section of some dozen pages or so forms a brief introduction to the

rock garden.

Generally the book may be held to be a satisfactory introductory guide for new gardeners written in a simple, clear, concise style, giving sound advice without technicalities, and for those who desire such a book we can strongly recommend it. The price, however, is not quite so reasonable as it might be for a book of this size, which is likely to have a fairly large sale. This is not the book for the advanced "specialist."

"A Garden in the Veld." By R. E. Boddam-Whetham. 8vo. 290 pp. (Speciality Press, Wynberg, Cape, 1933.)

It is natural that those who have gardened in the British Isles when they settle in a new country will try to make their garden of plants and in the style of the old ones with which they have grown familiar. As time goes on, if they are possessed with the true spirit of gardening, they will have learnt by their mistakes to adapt their planting to the new situation, and by and by they will have evolved a new type of garden and will have adopted a whole host of new plants into their affectionate regard.

A few who have had this experience have taken the trouble to write it for the benefit of others and this book is one result. Would that there were more of the

same kidney.

Mrs. Boddam-Whetham went to Orange Free State, the garden was to make. Like all good gardens it is still being made, and this book is the story of its making, told with humour and understanding, and illustrated with photographs taken by herself-one could wish the block-maker had taken the trouble to get a little more out of the photographs, as he might have done.

It is the story of a garden in the sun and it should be welcome to all who

garden in sunny lands, and to all of such we heartily commend it.

"The Pruning of Hardy Fruit Trees." By H. Dunkin. 8vo. 77 pp. (J. M. Dent, London, 1934.) 5s. net.

The author states that his reason in writing this little book is to supply "a clearly defined system of pruning all kinds of fruit trees which can be relied upon to produce first-class crops as regularly as the climatic conditions will permit. In this he has attained some measure of success, and the practical instruction, relating to the management of all kinds of hardy fruit trees, should prove helpful to the professional gardener as well as to the inexperienced amateur. It is hardly to be expected, perhaps, that experienced fruit growers will find themselves in complete agreement with many of the methods detailed; certainly recom-mendations do not always follow the practice of most successful cultivators. Nevertheless the book contains a vast amount of most successful cultivators.

Nevertheless the book contains a vast amount of most useful information, upon which the novice may rely for guidance. We cannot agree that the numerous diagrams are "the plainest and most practical of illustrations," nor always helpful, though in a few instances they will assist the tyro in following the mass of detailed instruction given. There is a useful monthly calendar of pruning operations at the end of the book, and a somewhat abbreviated index.

"Small-Fruit Culture." By J. S. Shoemaker. 8vo. 434 pp.; 52 illustrations. (Blakeston, Philadelphia, 1934.) 3.25 dollars.

This is intended as a text and reference work and as a guide to field practice in American States, based upon information derived from the results of research at various institutions, the experience of specialist growers, and the author's Various viewpoints regarding the regional or cliown work with small fruits. matic adaptability of small fruits and their successful management in commercial plantations are presented, and cultural practices for Grapes, Strawberries, Raspberries, Currants and Gooseberries, Blueberries and Cranberries are discussed fully. Regarding the Strawberry, it is interesting to note that many Strawberry growers fruit the plants only once and then turn them under, although fruiting the beds two years is perhaps the commonest practice in most sections. Rarely is it profitable to crop the plants for three seasons. The book contains a mass of valuable information which should prove of great practical value to American growers of small fruits.

"Year Book. American Amaryllis Society." 8vo. 101 pp. (American Amaryllis Society, Orlando, Florida, 1934.)

A new Society devoted to a particular flower, the Amaryllis, using the name in the wide sense to include all members of the sub-orders Amarylleae and Alstromerieae, has been started in America and we have just received the first "Year Book."

It contains a considerable mass of information, partly reprinted from older books, as the classification of the two sub-orders and certain articles on Amaryllis-breeding, partly as short notes on various plants of the groups in question together with a few illustrations

question, together with a few illustrations.

The volume is dedicated "In Memoriam—Henry Nehrling, 1853–1929," and a portrait of this well-known naturalist, who did much to encourage the cultivation of Amaryllias in Florida, forms the frontispiece, and several notes of his work appear in the book. It is a good beginning for a Society, to which we wish a prosperous future.

"The Home Gardener's Pronouncing Dictionary." By A. C. Hottes. Ed. 2. 8vo. 100 pp. (Meredith Publishing Co., Des Moines, Iowa, 1934.)

This little book is of the kind often enquired for, and though not quite without mistakes—there are few such—it has evidently been carefully compiled.

The common genera in cultivation are included, and the common specific names each with its pronunciation and meaning, and frequently brief notes on the appearance of the genus. as. e.g.:—

"Spiraea (spy-reé-ah). Spirea. Hardy shrubs. Rose or white flowers, variously arranged. Nonwoody sorts are properly known as Aruncus, Filipendula, Astilbe."

There are also included common names, e.g.:-

"Star, Blazing Liatris
Star-apple Chrysophyllum
Starfish flower Stapelia"

Notes on the way plants are named add to the value of the book.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Abutilon, Studies of the Occurrence and Transmission of Virus Diseases in the Genus. By J. Y. Keur (Bull. Torrey Bot. Club, 61, pp. 53-70; figs.; Feb. 1934).—As is well known, the variegation of Abutilon striatum Thompsonii is transmissible by grafting (but so far as is known by no other means) to other species of Abutilon and to other genera of Malvaceae. Hitherto no transmission by seed has been recorded, but in the series of experiments carried out by the author, out of 3,185 seedlings (from parents at least one of which was variegated) 461 showed variegation; but of these seedlings only four transmitted their variegation on grafting to the very susceptible A. Regnellii. These four were raised by crossing A. Mulleri with A. Thompsonii. This suggests that two different forms of variegation occurred, only one of which was transmissible, and that this form is very rarely reproduced in seedlings.—F. J. C.

Aloes. By L. Bolus and N. S. Pillans (S. Afr. Gard. xxiv. pp. 24-28; Jan. 1934; figs.).—A note on Aloes in cultivation at Kirstenbosch, where seventy-nine species are growing, followed by descriptions of four new species: A. corifolia, related to A. abyssincia but with smaller leaves and flowers and longer, narrower racemes; A. immaculaia, from the Transvaal, differing from A. transvaalensis by its unspotted leaves and smaller flowers and from A. affinis by its smaller leaves and flowers; A. khamiesensis, related to A. microstigma but taller, with larger and less spotted leaves, a branched inflorescence and larger flowers; and A. Vanbalenii, near A. arborescens but with large recurved and deeply channelled leaves.—F. J. C.

Anthemis Sancti-Johannis. By W. B. Turrill (Bot. Mag., t. 9339; Jan. 1934).—A plant (discovered in 1926) in woods in Bulgaria at an altitude of 4000-5000 feet, but growing best in well-drained situations in England. Raised from seeds or from basal growths. It has orange rays scarcely as long as the diameter of the orange disc.—F. J. C.

Apple and Pear Scab in East Anglia. By W. A. R. D. Weston and F. R. Petherbridge (Jour. Pom. xi. pp. 185-198; figs.; Sept. 1933).—Infection in spring was found to come mainly and primarily from pustules on spurs and non-fruiting wood, not much from the ascospore stage of the fungus Venturia sp. Aphides were found to carry the spores on their bodies. The authors regard one pre-blossom spray as most valuable on varieties not subject to infection of the wood.—F. J. C.

Apple Trees, Influence of the Cion and of an Intermediate Stem-piece upon the Character and Development of Roots of Young. By H. B. Tukey and K. D. Brase (U.S.A. Exp. Sta., Geneva, New York, Tech. Bull. 218; Nov. 1933; figs.). Experiments are described which gave results indicating that the nature of the scion employed determined to a great extent the nature of the root development and not vice versa. This result was obtained irrespective of an intermediate stem-piece, the presence of which, provided a smooth union was made between the parts, had no influence. The stocks used were pieces of roots of French crab stocks, the stocks commonly employed in American orchard work, and the authors consider the effect of grafting upon growth is determined not by either root stock or scion or the nature of the union between the two, but by the interaction of all three, and they suggest that differences in results obtained in England and in the States are due to differences in climate and to the fact that here vegetatively propagated stocks are in common use.—F. J. C.

Berberis Aquifolium and B. repens. By C. V. Piper (Cont. U.S.A. Herb. 20, pp. 437-451; 1922).—The original descriptions and specimens collected by the discoverers of these plants are discussed, and the conclusion is that the specific

name Aquifolium should be retained for the tall species with shiny leaves, the name repens being associated with the smaller species with glaucous leaves from British Columbia to California.—F. J. C.

Callicarpa rubella. By A. D. Cotton (Bot. Mag., t. 9340; Jan. 1934).—A Chinese plant introduced by our Society in 1824, from China, and later also by Fortune; excellent for the greenhouse, with small pinkish flowers in the leaf axils in July and bunches of persistent rose-purple berries on the leafless stems until February.—F. J. C.

Campanula propinqua grandiflora Milne Redhead (Bot. Mag., t. 9349; April 3, 1934).—Called C. Cecilii when first shown from seed collected by the Hon. R. W. E. Cecil in Iraq (Journal R.H.S., 57, xxiv.). An annual species with large open campanulate flowers, violet and mauve. Seeds not readily set.—F. J. C.

Catasetum maculatum. By V. S. Summerhayes (Bot. Mag., t. 9347; Jan. 1934).—A plant from north-east S. America with green and purple male flowers in spikes bearing 3 to 8 flowers. The female flowers are probably green.—F.J.C.

Edraianthus, Observations on the Genus. By F. Lemperg (New Flora and Sylva, vol. 5, pp. 136-144; figs.; Jan. 1933).—Notes on the species of Wahlenbergia sometimes included under the name Edraianthus (as here), with a key for their discrimination and a brief account of their habitat are given for Edraianthus serpyllifolius and the varieties albo-violaceus, albus, and major; E. pumilio, E. dinaricus, E. intermedius, E. Wettsteinii (the author thinks E. stenocalyx may be this), E. dalmaticus, E. serbicus, E. tenuifolius, E. herzegovinus, E. graminifolius, E. niveus, and other varieties, E. Owerinianus, E. parnassicus.—F. J. C.

Fritillaria recurva Benth. By W. B. Turrill (Bot. Mag., t. 9353; April 1934).—One of the brightest of the genus, with flowers bright red outside and yellowish within, the perianth tubular with segments recurved at the tips. Native of S. Oregon and California. Hardy.—F. J. C.

Gazania longiscapa DC. By J. Hutchinson (Bot. Mag., t. 9354; April 1934).—A perennial stemless species from the coastal districts of S. Africa, with yellow flowers stained purple without. The leaves are variable in shape, glabrous above and white-woolly beneath.—F. J. C.

Geum versipatella Marquand (Bot. Mag., t. 9344; Jan. 1934).—A Nepalese species with white flowers facing downwards, up to 18 inches in height. Apparently hardy at Kew.—F. J. C.

Habenaria splendens Rendle. By V. S. Summerhayes (Bot. Mag., t. 9350; April 3, 1934).—A large-flowered species from East African mountains, flowers white and green, long spurred, the lip with linear lobes.—F. J. C.

Hypericum kouytchense. By E. Milne-Redhead (Bot. Mag., t. 9345; Jan. 1934).—Closely related to H. patulum but more prostrate and with narrower petals and sepals. Flowers about 2 inches in diameter. Plants less hardy at Kew than those of H. patulum.—F. J. C.

Iris histrioides. By W. B. Turrill (Bot. Mag., t. 9341; Jan. 1934).—The Iris figured in our Journal 58, p. 16.—F. J. C.

Jasminum Farreri Gilmour (Bot. Mag., t. 9351; April 3, 1934).—This is Farrer's 'F 867' collected by him on Hpimaw Hill, Burma. It has alternate ternate leaves with leaflets tapering at the ends and cymose inflorescences of scentless, deep-yellow flowers nearly an inch across. In gardens under the name J. Giraldii.—F. J. C.

Larix Potanini. By W. Dallimore (Bot. Mag., t. 9338; Jan. 1934).—L. chinensis, L. thibetica, L. Griffithii, are included in L. Potanini, a native of W. China, N.E. Burma, and S.E. Tibet, where it makes a tree up to 90 feet or more in height. It has not proved very amenable to cultivation in Great Britain. It is distinguished by its glabrous branches, and by small characters in the leaves and cones from its nearest allies, L. Griffithiana and L. Lyallii.—F. J. C.

Limonium Species in S. Africa. By L. Bolus (S. Afr. Gard. 24, pp. 124, 129; May 1934; figs.).—Limonium (the accepted name for Statices) is represented in S. Africa by about fifteen species, four of which are new and are here described, viz. L. namaquanum, L. teretifolium, L. Fergusoniae, L. acuminatum. L. roseum

is said to be the most beautiful of the S. African species and it has been brought into cultivation at Kirstenbosch and elsewhere.—F. J. C.

Lithops Lesliei (Journ. Bot. Soc. S. Africa, part 18, 1932).—A photographic illustration.—F. J. C.

Lonicera nitida E. H. Wilson. By W. J. Bean (Bot. Mag., t. 9352; April 1934).—Introduced by E. H. Wilson from W. Szechwan in 1908, and now common. Easily raised from cuttings. A neat bush with small evergreen leaves and insignificant flowers. Fruits when produced handsome.—F. J. C.

Meconopsis regia G. Taylor (Bot. Mag., t. 9348; April 3, 1934).—A yellow-flowered biennial from Nepal with fine winter rosettes of serrate leaves covered with silvery or golden-brown hairs. Stems about 3 feet, flowers 3 inches diameter. Seed sent to H.M. The King from the Prime Minister of Nepal and illustrated from a plant grown by Mr. T. Hay.—F. J. C.

Notholirion macrophyllum Boiss. By A. D. Cotton (Bot. Mag., t. 9355; April 1934).—Already figured in the Bot. Mag. as Fritillaria Hookeri and called also Lilium roseum, L. macrophyllum, etc. Native of Central Himalaya. Flowers violet-mauve.—F. J. C.

Parthenocarpy caused by the stimulus of pollination in some plants of Solanaceae. By S. Yasuda (Agric. & Hort., ix, pp. 647-656; March 1934).— Pollen of Petunia violacea germinated freely on the stigma of Nicotiana sp., resulting in the production of seedless fruits. The pollen of the egg plant grew but slowly and had no effect. Injection of water extract of Petunia pollen produced seedless fruits in Nicotiana also. The author concludes that the tube of the Petunia pollen gives a chemical stimulus starting the production of parthenocarpic fruits in Nicotiana.—F. J. C.

Parthenocarpy—Second Report on the behaviour of the Pollen Tubes in the production of seedless fruits caused by interspecific pollination. By S. Yasuda (*Jap. Jour. Genetics*, 9, pp. 118-124; Feb. 1934; figs.)—See foregoing.

Pelargonium moniliforme. By R. A. Dyer (Bot. Mag., t. 9342; Jan. 1934).—Native of the Karroo and Namaqualand, a stemless species with pinnatifid leaves and tuberous roots. Flowers in a 10–20-flowered umbel on a scape 16 inches in height, cream with small purple blotches at the base of the narrow petals.—F. J. C.

Pelargonium salmoneum R. A. Dyer (*Bot. Mag.*, t. 9357; April 1934).—Closely allied to *P. zonale*, with salmon-pink flowers and glaucous-tinged leaves which are somewhat fleshy. S. Africa.—F. J. C.

Pollination Studies of Apple Varieties, self- and cross-. By F. S. Howlett. (Jour. Agr. Res., vol. 47, pp. 523-538; Oct. 1933).—Experiments with Apple 'Rome Beauty' and a seedling from it, 'Gallia Beauty,' were made with the conclusions that both varieties are self-fertile to a certain extent but better crossed with other varieties, and that they are not effective inter-crossed as they gave only the same percentage of fruits when crossed together as when selfed. Several varieties proved effective pollenizers for these two.—F. J. C.

Raspberry Mosaic Disease. By R. V. Harris (Jour. Pom. xi. pp. 237-255; figs.; Sept. 1933).—The following range of leaf symptoms has been recorded at East Malling in studying this disease: (a) Mottling evenly over entire leaf, yellow patches not sunken, leaf not curled or distorted. (b) Yellowish patches ill defined and slightly sunken, usually towards margins and between the main veins, with symmetrical down-curling of the leaf-blade about the mid-rib. (c) Yellow spots sharply defined, deeply sunken, scattered and accompanied by irregular crumpling of the leaf-blade. In addition in the variety 'Helston' leaf-curl occurs, and there is a peculiar form of chlorosis in the variety 'Devon.' Symptoms may be masked by certain weather conditions and vary in intensity in different districts.

Red Currant, Identification of Varieties. By C. R. Thompson (Ann. Rept. Long Ashton Res. Sta. 1931; pp. 28-39).—An attempt to differentiate the varieties of Red Currant and to ensure their identification by means of keys. A tentative list of synonyms is given.—F. J. C.

Rhododendron charitopes Balf. f. et Farrer. By J. Hutchinson (Bot. Mag., t. 9358; April 1934).—Introduced by Forrest, but first found by Farrer in Upper

Burma. Flowers "apple blossom pink speckled with crimson." Shrub 3 feet, leaves fragrant, about 2 inches long, 1 inch wide, flowers about 1 inch across in threes (or fives) at tips of shoots in April.—F. J. C.

Rhododendron eriogynum. Balf. f. et W. W. Smith. By J. Hutchinson (Bot. Mag., t. 9337; Jan. 1934).—Native of Yunnan and nearly related to R. facetum, a species with large compact trusses of deep red flowers, not quite hardy, and forming a bush up to 9 feet high.—F. J. C.

Rhododendron tephropeplum. By J. Hutchinson (Bot. Mag., t. 9343; Jan. 1934).—This is a small plant up to 4 feet in height from S.E. Tibet, discovered by Farrer and also found by others in the same area. Leaves about $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch broad, with numerous scales on the lower surface. Flowers in 5-flowered terminal umbels, about $1\frac{1}{2}$ inch across, vivid rose without spots. Syn. R. spodopeplum.—F. J. C.

Rodgersias. By J. W. Besant (New Flora and Sylva, vol. 5, pp. 94-96; fig.; Jan. 1933).—Notes on the species in cultivation with brief descriptions and recommendations on their cultivation. Rodgersia aesculifolia, R. pinnata, R. pinnata alba, R. pinnata superba?, R. podophylla, R. sambucifolia, and R. tabulans are dealt with.—F. J. C.

Roses, European (Les Roses d'Europe de l'Herbier Crépin). By G. A. Boulenger (Bull. Jard. Bot. Brussels, vol. xii, pp. 193-542; April 1932; figs.).—The author continues his critical study of the roses occurring wild in Gt. Britain, France, Belgium, Holland, Switzerland, and Germany. In this part he deals with the Group Gallicanae (Rosa gallica) and the Section Synstylae (R. arvensis and R. sempervirens) and the hybrids which have been found. Copious references to literature, full synonymy, and critical descriptions are given.—F. J. C.

Salvia ringens var. romanica. By H. K. Airy Shaw (Bot. Mag., t. 9346; Jan. 1934).—The plant called Salvia coeli when shown in 1931, with large violet-blue flowers in crect racemes about 4 feet high. A herbaccous perennial, but liable to be killed in damp winters.—F. J. C.

Self-incompatibility in Solanaceae iii. By S. Yasuda (Ann. Rep. 9, Saito Hoon Kai, Sendai, Japan, p. 87; Dec. 1933).—Working with Petunia violacea, the author concluded that self-incompatibility is the result of the formation of substances in the placenta which inhibit the growth of the pollen tube in stigmas of the same or nearly related flowers.—F. J. C.

Self-sterllity in Petunia. By S. Yasuda (Ann. Rept. Saito Ho-on Kai, Sendai, Japan, 1931).—The presence of a substance in the ovary and style of Petunia violacea is reported, which checks the growth of the pollen tube in the style when the pollen is derived from the same plant, but favours the growth of the tubes of pollen derived from other plants. (More fully reported in the Bot. Magazine, Tokio, June 1931, pp. 301-313, with English summary.) In a second contribution (Bot. Mag. Tok., April 1932) it is announced that the substance is most abundant in the placenta, is inactive in old and weak plants, but is more active in plants grown in a high temperature. The substance is reported to be water-soluble, and to persist after the drying of the pistil.—F. J. C.

Stapelia Schinzii (Journ. Bot. Soc. S. Africa, part 18, 1932).—A photographic illustration.—F. J. C.

Strawberry Culture. By L. Gallard (Agr. Gaz. N.S.W. xxxi. pp. 731-737, 815-822; 9 figs., I plate).—All strawberry growers should learn to recognize the Scolid Wasp (Discolia soror) and the Therevid Fly (Anabarrhyncus) and its larvæ, as they are the greatest enemies of the beetle grubs which feed on the roots of strawberry plants.—S. E. W.

Strawberry, Degeneration of the. (Technical Communication No. 5, Imperial Bureau of Fruit Production, Feb. 1934.)—The problems associated with the "degeneration" of the Strawberry are still far from being completely elucidated, but the available information is collected and presented in concise form. The communication is composed of four distinct contributions, and reviews of investigations conducted in Europe and America dealing respectively with the pomological, virus, root-rot, and entomological aspects. There are more than 160 references to American and European literature dealing with the numerous problems involved.—A. N. R.

Tomatos, Some Experiments with. By A. J. Olney (U.S. Agr. Exp. Stn., Kentucky, Bull. 218, 17 pp.; 5 figs., 6 tables).—The conclusions arrived at by the experimenters are given as follows:

Pot-grown plants are more productive than flat-grown plants.

Staking and pruning reduce the yield of marketable fruit per plant, but increase the yield per acre because of the greater number of plants that may be

Pruning increases the size of the individual fruit.

Tomatos staked and pruned ripen approximately one week earlier than those untrained.

It does not pay to stake and prune tomatos grown for the canning factory. It may pay to stake and prune tomatos for the home garden or in very intensive trucking areas.

The cost of the stakes, the additional labour involved, and the greater number of plants required may be the limiting factors for profitable staking and pruning.

F. G. A.

Tulipa Stapfii Turrill (Bot. Mag., t. 9356; April 1934).—This is the plant described by Dr. Stapf as T. cuspidata, but that name is untenable. The species is nearly related to T. montana, from which it differs in the wider inner perianth pieces, the outer being cuspidate.—F. J. C.

Vegetables, Preservation of, by Fermentation and Salting. By L. A. Round and H. L. Lang (U.S.A. Dep. Agr., Farmers' Bull. 881; Aug. 1917).—As a means of varying the diet during the unproductive months, methods of preserving vegetables by fermentation and salting are here presented to the notice of housekeepers.

The best-known forms of these preparations are the salted beans in use in many houses and sauerkraut. Various ways of fermenting other vegetables are here described, and also methods of salting without fermentation. Recipes

for cooking the resulting material are also given.—M. L. H.

Wistaria floribunda and W. sinensis. By Dr. J. Valckenier Suringar (Jaarboek, 1931, d. Nederl. Dendrol. Vereenig.; figs.).—The identity and synonymy of Wistaria floribunda and W. sinensis are discussed and the two species compared. The figure in Sweet's British Flower Garden, 1827 (t. 211), is accepted as the first unmistakable figure of W. sinensis and that of Glycine sinensis in the Botanical Register (t. 1822) as probably representing W. floribunda. W. floribunda has both inflorescences and leaves longer than W. sinensis.—F. J. C.

Woolly Aphid of the Apple and Elm, The. By F. V. Theobald (Jour. Pomology, ii. No. 3, pp. 199-205).—The treatment of Eriosoma lanigera Hausmann is dealt with in this second part of the paper describing its life-history.

The author is of the opinion that the only lasting remedy is the use of Aphisfree or Resistant Stock, which, though commonly practised in America and some of our colonies, is not popular in this country. Treatment and Prevention is given under four headings: (1) The use of Immune Root Stocks, as 'Northern Spy' and 'Irish Peach.' Both Crab and Paradise Stocks are liable to carry the root form, particularly the latter; (2) Root treatment, which is not advocated, although carbon disulphide is the most successful; (3) Grease banding to trap the migrating root to stem form in the spring; (4) Spraying—several nicotine and paraffin washes are used, but the former are the most efficient, as they need be applied with much less force than the oil emulsions. Caustic winter washing is useless.

The time to spray is between the end of July and early September. Belumnite, a proprietary dust spray, gave a marked success, nearly equal

to the nicotine washes.

(3) Stock—this pest is often spread by nurserymen sending out infected stocks, and all stocks should be fumigated with hydrocyanic acid gas at full strength (sodium cyanide, $\frac{1}{2}$ oz., sulphuric acid, 1 oz., water 4 oz., to 100 cu. feet for 2 hours).—G. F. W.

JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

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FOREWORD.

By the LORD ABERCONWAY, President R.H.S.

THE Journal of the Royal Horticultural Society has had nearly fifty years of existence in its present form, as a publication issued two or three times a year. Starting with a tiny circulation it has with successive increases in the Fellowship of the Society now achieved one of very large proportions. The Journal has always had the character of a learned journal of a Learned Society. It has tried to teach as well as to interest; it has dealt with facts rather than with fancies; it has endeavoured to avoid repeating that which may readily be found elsewhere; and its repute has attracted writers of knowledge and of eminence who have given it of their best.

Although the JOURNAL has entered on a new form with this number, it is not intended that the valuable qualities of the old JOURNAL shall be superseded. It is desired to add rather than to replace.

It is believed that a monthly publication will enable Fellows to keep more closely in touch with the Society; records will be more up-to-date; news can be given while it is still fresh; information of coming events can be made available; notes of more immediate interest can be introduced; the most recent information as to the Society's activities at Wisley can be included.

The Society has many announcements to make to its Fellows, and while the Gardening Press are most helpful in this matter, it will be an advantage to be able to make them also directly to the Fellows through the JOURNAL. It is proposed, moreover, to discontinue the issue of the "Book of Arrangements," and to include in the January

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and February numbers of the Journal the more important of the matters hitherto included in that publication. The List of New Fellows will, however, be published separately, probably every three years.

Fellows who live near London and can attend the meetings of the Society, and who can visit the Wisley Gardens, are readily able to keep in touch with its activities; those who live at a distance—and there are a rapidly increasing number of them-naturally find this more difficult. A monthly Journal will, it is hoped, do something to make the Society a greater help and more of a reality to this class of Fellow.

With this object in view the JOURNAL in its new form will be sent to all Fellows, except to those who inform the Secretary that they do not desire to receive it—as may well be the case, for instance, where more than one Fellow resides at the same address.

THE RHODODENDRON ROCK GARDEN AT EXBURY.

By LIONEL DE ROTHSCHILD.

Many have found the growing of alpine Rhododendrons unsatisfactory in situations where hybrids and species flourish, and Exbury is no exception to the rule. The Sanguineums were distinctly difficult, whilst the Lapponicums and Saluenenses were never happy in the woodland and required more light and air.

As many alpines are successfully grown in the rock garden, including the moraine, and as those Rhododendrons which grow at high altitudes in the Himalayas and Chinese Alps are truly alpines with a wet climate in summer and snow in winter, it seemed as if they wanted somewhat similar treatment to make them a success in our climate. There happened to be an old gravel pit available in one of the woods, with a kind of ravine leading up to an open hollow: on each side of the ravine some oak trees are growing which give a certain amount of shade and, where they overhang, a certain amount of protection (fig. 116). This gravel pit has been turned into a rock garden, for the sole purpose of trying to grow these difficult Rhododendrons. Sandstone was essential, and this was procured from Wales and laid under the skilful supervision of Mr. Balls, acting for Clarence Elliott, Ltd. The British Overhead Irrigation Company was consulted and supplied fine sprays covering every portion of the rock garden, and by means of this the whole can be well soaked with water once a week, whilst where *Rhododendron repens* grows in crevices of the rocks, pipes sunk behind the stones enable water to be applied underground.

As the open hollow was exposed to the east wind, the trees in the arboretum (which is that side of it) being only a few inches high, *Pinus radiata* was planted to form a quick-growing shelter belt, and this should in a short time do much to help mitigate the drying effect of the March winds. All round the rock garden a fringe of Triflorums has been planted, mostly *R. yunnanense* or *R. chartophyllum praecox*, partly for their effect when in flower, but principally because their light foliage mingles better with the alpines than the heavy green of the discolor hybrids which cover this part of Exbury gardens.

The rock garden has now been completed some three or four years, and it is possible to see some of the results. In the first year some of the Lapponicums were planted in a portion of the ravine (fig. 117) and some of the Sanguineums on the west side of the depression at the end, but as the Sanguineums seemed to be doing better in the ravine and the Lapponicums better in the open, they were changed over. Unfortunately a certain amount of trouble due to honey fungus

(a disease which is very prevalent at Exbury) appeared and a number of plants were lost from this; but with this exception the Sanguineums may be said to thrive very well in their present quarters, making fine bushy plants, though they are not flowering freely yet. R. repens (fig. 118) is growing very well on both sides of the ravine among the rocks and in crevices—the increase in size of leaf and vigour is remarkable where these are touching the rocks and crawling over them. In the ravine at the top of the rocks is planted R. bullatum, Rock No. 59583 (fig. 119), a fine pink form of this beautiful Rhododendron, and R. sperabile var. weihsiense (fig. 120). In the field notes I noted that both these species are found growing among rocks and crags, and I accordingly planted them in similar positions. In both cases their growth has been remarkable, and in the case of R. sperabile, while I have plants of the same variety growing in the woodland, those in the rock garden are double the size and have stood the frost perfectly, whilst those in the woodland seem to have grown softer and to have suffered from it. R. bullatum against the rocks, where it is protected from the north and east and shaded from the southern sun, has stood the climate well. R. aperantum flourishes in pockets amongst stone, and last year certainly kept all its leaves in perfect health, while in the nursery, before it was planted out, it was often shabby at the end of the summer. It has thrown an odd flower, but I fancy that we must exercise the same patience with most of the Sanguineums that we have to do with the larger-flowered species and allow them to grow to maturity before we expect much result.

The true R. sanguineum sent back by Rock, as described by Franchet originally, is thriving, and so are the various forms of R. haemaleum, while R. citriniflorum has once flowered freely. On the whole the experiment as regards Sanguineums has certainly enabled me to grow them better at Exbury than before the rock garden was built (fig. 121).

Many of the Boothii Series like their position amongst the Sanguineums, R. commodum (fig. 122) being particularly happy among the rocks, while R. leucaspis against the sandstone has twice the size of leaf it usually has (fig. 123): R. megeratum seems also at home, while R. tephropeplum on the upper slopes has survived the winter well and flowered this spring, but suffered badly from the frost where it was planted at the bottom of the rock garden. R. charitopes (a Glaucum) romps away, but it is so beautiful that I do not grudge it its position, though I rather fancy that this Rhododendron would do equally well in the open woodland. R. tsangpoense is also a pretty little Rhododendron in the same series. All these seem to require the same treatment with regard to water in summer—namely, that as long as the drainage is all right they cannot have too much and are comparatively easy to deal with.

Other Rhododendrons in the ravine are some of Kingdon Ward's R. virgatum, which seem on the tender side, having been cut where

Fig. 116.—Rhododendron Rock Garden at Exbury. Looking down the Sanguineum Ravine. [To face p. 326.

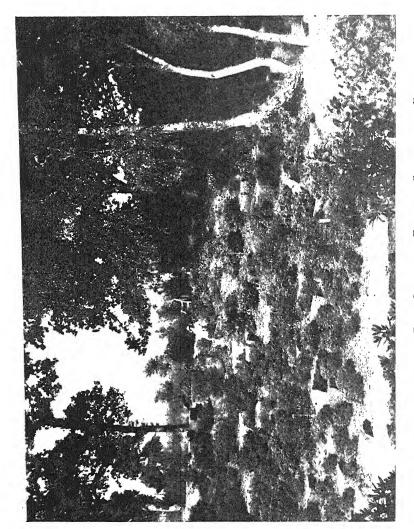


Fig. 117.—Rhododendron Rock Garden at Exbury. Slope in the Ravine.

the cold wind got them, and they had to be moved to a more sheltered position. That beautiful member of the Azalea Series, R. Albrechtii, seems to like the position it occupies and is growing well, and of course any members of the Roxieanum sub-series which are lucky enough to have found a place there are perfectly happy: some were planted in between other plants to cover the ground, though R. proteoides has been planted permanently in rather a draughty position low down against the path (fig. 124). I do not know how long it will be before we shall see its flowers, but the perfect little hedgehog it forms with its small, bright green, pointed leaves in robust health is a joy to look at.

Although not a true alpine, a low-growing member of the Trichocladum Series finds a place in this part of the garden and, owing to its dwarf habit, seems more suitable here than elsewhere-I refer to R. lepidostylum, which, growing in open situations on cliffs in Western Yunnan, is eminently suited for its position. Its flowers are pale vellow and not particularly conspicuous, but the bright blue-green of its new leaves make it a most attractive shrub. A dwarf member of the Triflorum Series, namely, R. caesium, is planted under an oak tree, and with its bright green foliage and yellow flowers has found a permanency as far as I am concerned. R. Keiskii is also a small Triflorum which is worth growing, and its yellow flowers are most attractive, though its foliage and habit are more ordinary. Both R. hirsutum and R. ferrugineum, more ordinary rock plants, flourish, while R. racemosum, R. hemitrichotum, and R. pubescens grow where nothing else will. R. scabrifolium, however, requires a more sheltered position owing to its early flowering habit, and this always pleases me with its white flowers in February—too often, alas, cut by frost!

The Lapponicums (fig. 125), Saluenenses and Campylogynums are all doing well in the open, though here again honey fungus took its toll and wiped out almost completely 100 R. russatum which I had raised from the finest blue form. R. flavidum is the first to open, with its pale yellow flowers, quickly followed by R. scintillans, which varies so much that care in selection is necessary when acquiring this Rhododendron. Then the great mass troop along—russatum (fig. 126), dasy-petalum, impeditum, orthocladum, tapetiforme, telmateium, verruculosum and many others in their riots of mauve and purple, followed last by another yellow—chryseum, which ends this section in flower; it is curious that it should both commence and finish with a yellow-flowered species.

The bottom of this portion of the rock garden is very little above the water-level after heavy rains, as the hillside on the west is one mass of springs which emerge where the clay of the valley reaches the gravel of the New Forest formation, and as at first I did not realize this, several batches of Lapponicums were lost. R. hippophaeoides, however, flourishes, and as this plant is essentially growing in bogs in its native habitat, it is really at home here and luxuriant in foliage and flower.

By this time the Campylogynums have begun to put forth their nodding bells, and these grow especially well in crevices of the rocks, where their toes can be tightly pinched and yet keep cool and moist (fig. 127). But as the Lapponicums go over the Saluenenses (figs. 128, 129) come into their own. I confess that their magenta colour appeals to me less than the former, but by themselves they make fine blobs of colour when in full bloom, and of these the deepest of all is R. saluenense itself, which has been propagated from a particularly fine seedling in a batch raised from Chinese seed. R. calostrotum, a most attractive shrub, does not seem to like a too open position and wants protection from some of the sun, though R. keleticum and R. radicans spread over the rocks in their dense mats and do not seem to mind where they grow.

Of all these purples, however, I am not sure that some forms of R. riparium will not prove to be the best. I have not had luck with these, some going off with honey fungus and others being planted in the water-logged position I have mentioned before; a particularly fine form was luckily growing by itself and is being propagated. Kingdon Ward's R. fragariflorum, with crushed-strawberry colour flowers, is the least happy of this section at Exbury, and I do not think I have yet got the right place for it: it comes from 15,000 feet altitude and, like all high alpines, is more difficult in our climate—from his description it is among the most beautiful.

It is when we come to the Anthopogons, the Cephalanthums and Lepidotums that the greater difficulty occurs, and I feel that experiments are still needed to find the best places for these three series, which contain some of the most beautiful of the alpines. R. imperator (of the last series), which grows extremely well at Embley Park, and which apparently grows on bare ledges of granite cliffs, fully exposed, in Burma, did not like the open ledge I selected for it in the rock garden, and I had to remove it to another place last winter. so it is too early yet to see how it is going to do. R. pumilum also. which did extremely well for two years at the base of a rock, died out last year, and I could not discover whether it was too much or too little water which killed it. Cuttings and seedlings of it are coming along and will have to be tried in other positions. R. Baileyi, on the other hand, seems to like its place at the top of the ravine, and always pleases me with its reddish-purple flowers, luckily produced after all the Sanguineums have finished flowering.

The Anthopogon and Cephalanthum Series, however, puzzle me still more—some do well for a certain number of years and then seem to go back, while others are even still more fastidious. R. radinum seems one of the easiest, and the bushy little plants were covered with flowers this summer right in the open: R. sphaeranthum, on the other hand, has done better since I moved it to a shady position above the rock garden, where anyhow the mortality has ceased. Rock told me that a great many of them grow on the tops of the hills in open pine woods almost at the limit of the pine growth, where although there was ample

rainfall the firs kept the ground dry, and perhaps in the rock garden they get too much water. Some of them certainly succeed, but I have had to change the site of R. crebreflorum, which I had growing right in the open and which, from its elevation, should be perfectly hardy, but which unfortunately-missing its winter snow-got frosted at Exbury. But the form growing at Exbury is a very much smaller, more prostrate type than the one which secured an Award of Merit this year at Vincent Square. R. Sargentianum has also been difficult, but gardening would be too easy if it was always a success, and while my rock garden is imperfect in many ways I have had much fun from it and have been able to grow many alpine Rhododendrons which I feel sure would not have succeeded in the open border. To anyone who wishes to grow these I would strongly recommend a situation sheltered from the cold winds and open above but not exposed all day to the sun, where with a few rocks and ample watering many of the smaller species will thrive and give much pleasure.

QUALITY IN EARLY VEGETABLES.

A DISCUSSION AT THE ROYAL HORTICULTURAL SOCIETY'S HALL, APRIL 17, 1934.

[Lord Aberconway, President, R.H.S., in the Chair.]

In connexion with the Exhibition of early produce arranged by the Society to draw general public attention to the activities of English growers in the production of early vegetables and flowers, a discussion on Quality in Early Vegetables was arranged in the Lecture Hall.

The principal speakers, approaching the matter from different angles, were: Dr. W. F. BEWLEY (p. 331), Mr. C. BIANCHI (p. 333), Lady Muriel Beckwith (p. 336), Mr. W. B. Shearn (p. 337), Mr. G. S. Lancashire (p. 340), and Mr. F. A. Secrett (p. 342), and the following is an abridged account of the discussion.

The CHAIRMAN, in introducing the subject, said: May I say, on behalf of the Royal Horticultural Society, how very glad we are to have an opportunity of co-operating with the growers of early vegetables in an attempt, which has proved so successful, to show how well these vegetables can be grown in this country.

As you know, in past years very large quantities of spring vegetables have been sent to England from abroad, and now home-growersthanks to the action of the Government on the advice of the Import Duties Committee—have been materially helped, and the production of early vegetables in this country is showing a very rapid increase.

The growers want to show, not only that they can produce the best kind of vegetables, but also that they can market them in the excellent manner which presents them in the very best possible form to the consumer; and evidence of that fact and of their ability to grow firstclass vegetables has been before us all in the Hall to-day. There are a great number of most excellent exhibits, and the Council of the Royal Horticultural Society has awarded no fewer than three Gold Medals to various exhibits.

Now this Conference is called here this afternoon to discuss the question of quality in early vegetables.

The one thing wanted is for the grower and consumer to be coordinated. The grower naturally takes pride in getting the largest possible size in vegetables; but the consumer does not necessarily like that kind of vegetable, and we hope to-day, by asking representatives of various points of view, including the consumer of vegetables and the man who cooks them, to state their case, to impress upon the growers the importance of having their vegetables as the consumer likes them, while we hope to impress upon the consumer the

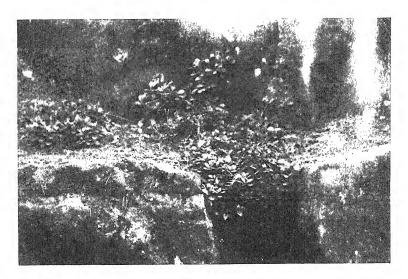


Fig. 118.-- Rhododendron repens at Exbury.

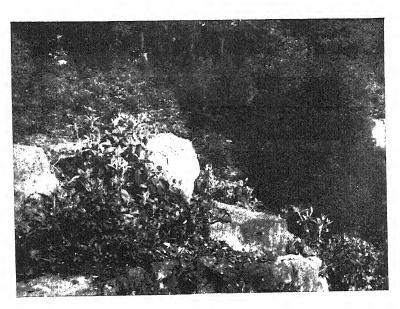


Fig. 119.—Rhododendron bullatum at Exbury.



Fig. 120.—Rhododendron sperabile var. Weihsiense at Exbury.

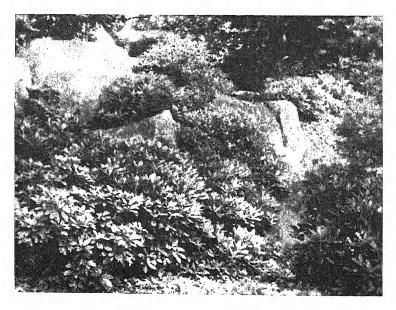


Fig. 121.—Rhododendrons of the Sanguineum Series at Exbury.

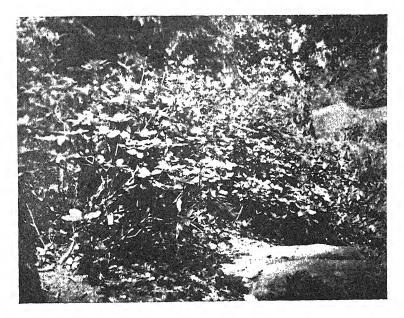


Fig. 122.—Rhododendron commodum at Exbury.

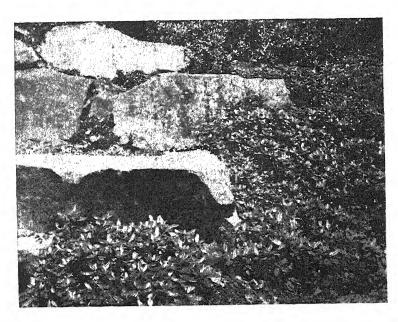


Fig. 123.—Rhododendron leucaspis at Exbury.

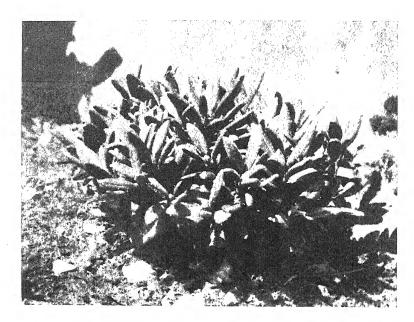


Fig. 124.—Rhododendron proteoides at Exbury.

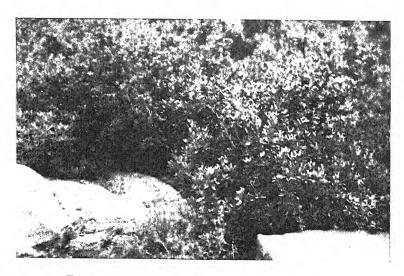


Fig. 125.—Rhododendron lapponicum at Exbury.

fact that the producer is prepared to produce the vegetable that he likes.

I call upon Dr. W. F. Bewley, Director of the Lea Valley Experimental Station, where are studied problems of market gardening, especially under glass, to open the discussion.

Dr. Bewley: As the opener of a discussion, it is my duty to put the problem to you. What is understood by quality? I take it to comprise food value, disgestibility—which I consider very important—and attractiveness.

As regards food value, I divide that into three portions:

- (1) Stimulation of appetite;
- (2) Nutritive value of the produce in the way of carbohydrates, proteins, mineral salts, and the free organic acids which it contains; and
- (3) Presence of vitamins.

With regard to the stimulation of appetite, that is a factor frequently overlooked in considering fresh vegetables. The mere fact of breaking a crisp vegetable in the mouth stimulates the secretion of the glands and causes us to want more. In that respect fresh vegetables should be demanded. A fresh vegetable is a vegetable in which the cell structure has just the right amount of water in its make-up, and cell tissue which contains a proper amount of sugar, proteins and mineral salts. Mushrooms, one of our early products, are particularly valuable because they constitute a very appetizing source of food. They stimulate us to want more.

The nutritive value of vegetables cannot be entirely estimated in terms of carbohydrates (sugars and starches), proteins and fats, for vegetables contain mineral salts and free organic acids and organic salts as well. They are all valuable foods, valuable in this respect: they are required by the blood, by the tissues, for a very important and a very useful purpose. Carbohydrates and proteins build up body tissue and give us energy, but these other very important salts which exist in fresh vegetables are foods and compounds which we greatly need.

In studying vegetables we are told—and I think there is some basis for the assumption—that the salts in vegetables exist in a rather peculiar condition, a semi-ionized state. It is possible that in the early vegetables produced to-day we have the salts in this condition, which makes them such a valuable article of diet. We know that the fresh vegetable gathered from the market one day and put on the table of the consumer within thirty-six to forty-five hours is much better than produce which has been cut and kept in store for a longer time.

It is not for me to discuss the complex subject of vitamins. The Board of Medical Research has published a huge volume—a work based on many years study on the vitamins in food of all kinds, and that book will give a vast amount of information. The whole subject of vitamins is particularly fascinating, and we know that any

vegetables which are gathered from the garden and put on the table quickly will have in them many of the vitamins in the greatest quantity.

Now as to digestibility: the digestibility of vegetables depends upon their freshness, their texture and their water content. We are all agreed about texture, which means a tender vegetable; that is the vegetable we are after. A relatively high water content in uncooked vegetables makes them crisp and facilitates their disintegration during the process of mastication, which is the important start of digestion. Digestibility depends upon the amount and character of the cellulose in the leaf or the vegetable itself. Now you, as growers, know that spring vegetables grown quickly have less chance of making fibre, less chance of becoming tough. Uniform and relatively quick growth will produce a vegetable which is tender and easily digestible. Easy digestibility in vegetables is essential to quality, and I think it is one of the reasons why the vegetables which are produced in glasshouses and in hot frames and cold frames and in the open in some of the more favoured parts of the country are so much desired by connoisseurs.

Vegetables should never be judged on the basis of size only. I put tenderness and good quality before size.

As far as attractiveness is concerned, as a member of the National Mark Committee for vegetables, I ask you to think kindly of the National Mark. To those who are buyers of vegetables I say, See what the National Mark vegetable is like, and, once you have tasted one, you will come to the conclusion that that is the vegetable for you. To you growers, who produce vegetables, I say, Study the conditions of packing under the National Mark and see what you can do to help. The National Mark Committee is doing its best to study the question of quality and packing and grading and presentation to the public in the right way. There is little use in growing the very best vegetables if they are sent to market in a slovenly fashion. Some have to be washed, some sprayed with water; all have to be properly handled and presented. Marketing plays an important part in quality in vegetables. Indeed, the colour and form of a plant are good guides to quality. They represent the final effect of growth under certain conditions.

I urge growers to consider the physical condition of the soil they use. The grower who starts with soil in the wrong physical condition has a handicap which is very difficult to overcome. Having chosen your soil, see that methods of cultivation are the best possible. If you do not know, go to the man who grows vegetables best of all in the country and find out from him. Study the soil conditions; get the soil right; get the temperature and the water supply right; get the manurial treatment right; and then, with a uniform, fairly steady growth, you will produce vegetables under the best conditions, and the final product will be something of good form and right colour. A plant which is grown under adverse conditions, checked at one point of its career, and at another too lavishly treated, has never a good form.

It has not been growing steadily and regularly, and those adverse conditions are reflected in the form.

The task of the grower does not cease in the field. The product must be picked in the early part of the day, packed under cool conditions and in such a manner that with normal conditions of transport and marketing it will reach the market in a fresh state.

After the market we pass the other people. To have vegetables of quality the salesman must do his job in the right way; and also the housewife. Good vegetables are often ruined by being thrown into the larder without proper attention. The cook has the great responsibility of presenting the vegetables on the table.

I must point out, too, the necessity of choosing varieties. It is no use choosing varieties which will not grow in the precise conditions prevailing in our gardens.

It is to be remembered that early vegetables are grown during periods of low light intensity. It is not a generally recognized fact, but it is nevertheless true, that of all the fertilizers which we put on our soil potash alone is the fertilizer which will compensate the plant to some extent for insufficient daylight. Early vegetables growing, as they do, under conditions of dull light and short days require an adequate supply of potash.

It would be foolish to imagine that our methods are so perfect that they cannot be improved, but experiment and research must ultimately provide information which will enable the home-grower to defy competition. Then our produce will reach the table in a fresh condition, free from disease, perfect in colour, perfect in form and possessing a high nutritive value.

The CHAIRMAN: We had expected M. Boulestin to speak to us, but he has been very badly shaken by a motor accident and Mr. Bianchi, the Chef from the Café Royal, has at very short notice consented to take his place.

Mr. C. Bianchi: I felt very honoured to be asked here to represent the Chef, who is the chief consumer, but I should not have accepted, not being an orator, had I not felt flattered at the invitation; so I forced myself to come here. But I want you to remember my position. I am just a chef, a man from the kitchen, and I ask for your consideration.

The necessity for quality in early green vegetables is very important as far as the chef is concerned. In the spring 50 per cent. of our customers are getting tired of meat and poultry and want something new. There is beef and chicken, and chicken and beef, and you don't know what to do. That is where the vegetable comes in. This is our problem. We have to make attractive menus, to produce new dishes, to make these dishes tasty; yet we have to keep off meat and poultry. Some people even go off fish, and again the vegetables come to the rescue, but they must be of first quality.

In past years a chef like myself, when this time came and we had to find something new, as a matter of course, switched on to Paris.

It was a household word: "New vegetables—quality vegetables—Paris," just as, if you want a nice piece of beef, you say "Scotland." Three years ago like other chefs, when this time came, I sent to Paris, and we got lovely stuff of good quality. At this period of the season we always got the stuff from Paris and we did not try home produce. That was my experience three or four years ago when I was first given charge of the kitchen of the Café Royal.

Then my British directors gave instructions to me to use British produce. I, being responsible, wanted to be a faithful servant, but I had to please my customers and to keep up my own reputation as a chef as well. I thought it rather a difficult problem, but I said I would try. I searched and I worried my tradespeople until I got the right stuff. It took me a long time, but I did get it. You do get very good quality early green vegetables at this time of the year in this country, but you have got to find out who grows them, and it is very difficult for us to find this out unless we set ourselves to do it and make ourselves do it, as I did. The result was that I found myself very satisfied. I got everything that I wanted and the Café Royal did not suffer. That was my experience three or four years ago, and you will find that now many chefs do not get the stuff from abroad as they used to, because some of them have taken care to go and find it here.

Now the position of the chef has changed. Years ago the hotel and restaurant trades were flourishing. Directors and proprietors used to make piles of money, and they did not bother the chef. He could spend what he liked as long as he got the right stuff and pleased his customers. Money was no object. In those days directors and proprietors actually used to make their money on the wines. Nowadays people do not throw away money on wine, and the directors and proprietors were forced to come to us; they had to ask us to help them gain more profit, a bigger percentage of profit, than they did five, six, ten years ago. Therefore the chef nowadays, to make a success of his restaurant or hotel, has got to be not only a good chef but a very keen buyer. Having to give more profit out of his kitchen to his directors, having to give better and improved cooking. and having to keep his prices as low as possible at the same time because competition is very keen and customers are not too plentiful, you see the position of the chef is no enviable one. So, if he is an ambitious man, he has to be a very keen man in every way. Therefore, though years ago when the spring came he would say: "New vegetables are wanted; this from Paris, this from Germany, this from Spain, that from Italy "-nowadays he has got to think differently. For instance. he used to get new carrots, turnips, tomatos, lettuce, etc., from Paris. They cost so much-say is.—but he says, "I must try and save a penny or twopence if I can," and he searches the home market. To his surprise he finds he can get nearly the same quality vegetables (I say nearly the same quality) cheaper, and he thinks it over: "Will they do this end?" Well, if he tries, he will discover that they will

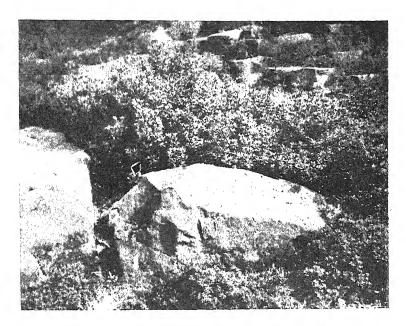


FIG. 126. -RHODODENDRON RUSSATUM AT EXBURY.

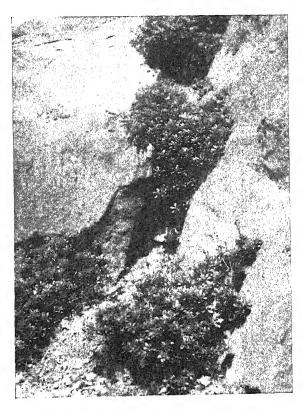


Fig. 127.—Rhododendron campylogynum at Exbury.

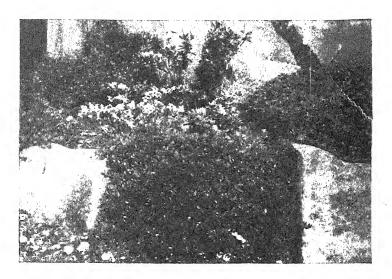


Fig. 128.—Rhododendron saluenense at Exbury.

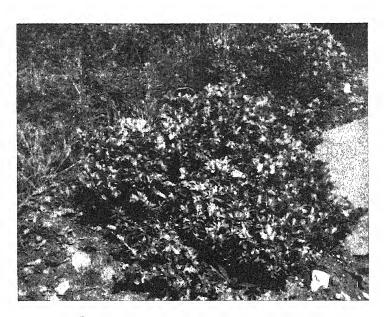


Fig. 129.—Rhododendron nitens at Exbury.

be just as good. Abroad, especially in France and Spain, the growers have been at work for fifty or sixty years. They are experts. Growers in this country, with the quality we want, are beginners, compared with them. Naturally that is why I say the quality is nearly as good; but, where the quality is lacking, you make it up through the vegetables being fresh gathered.

Now if we get new vegetables from Paris, they are one or two days old, even if you are lucky enough to get them straight from Covent Garden to your restaurant, and sometimes they are received three or four days later. But if your lettuces, carrots, peas or beans are gathered the day before or the same morning that you get them, their value is the same as far as eating is concerned, because if the British-grown produce has not quite the same quality as the imported, it is fresher. Freshness counts a lot as far as eating is concerned.

Take peas, for instance. You get peas two days old from France of the very first quality; you get peas here gathered the morning before, or sometimes six hours old, which are not quite such good quality. You cook them and they are just as tender and taste just the same. For when it comes to cooking we have to think of tenderness. French beans two days old will never cook so tender as those gathered the morning before. We want to tickle the palate of the customers to make them enjoy their meals.

That is where the first-class chef, the chef who is employed in a first-class restaurant or hotel, will help you if you can grow good quality vegetables, especially like those I saw in the Hall an hour ago. I consider that every year your quality is getting better and better.

Now 50 per cent. of the chefs, the first-class chefs, I think, will use your home-grown vegetables because they find them just as good when they come to be served. But the other 50 per cent. may not be so keen. Without going into details, they have a patriotic feeling; they say, "I shall help my countrymen abroad," just as a Britisher abroad tries to help this country over here. This last 50 per cent. would like to get their stuff from abroad, but they cannot do that now because their directors will not let them alone. The chef must give a better percentage of profit from his kitchen and pay lower prices.

There is one drawback with quality which you have to face, and that is that there are people who do not appreciate or try to get the benefit of good quality. These are the second-rate chefs, second-rate cooks, and a great percentage of second-rate housewives. They do not know how to use these freshly gathered and first-class quality vegetables. They think they are very dear simply because they cannot use them, cannot cook them, cannot get the good out of them. For instance, French beans or Jersey beans are now retailed at 2s. a lb. The bad cook or housewife never buys them because she thinks she cannot afford to do so. They think: "Beans? Just boil them!" But you could put them with some meat as garnishing.

In a small private hotel where there is a family staying, say a party

of six, the cook is allowed 2s. a head to furnish luncheon. Naturally this cook or second-rate chef will buy some meat, which will cost Is. a head; then there is something for soup, and he will have only 6d. left for the vegetables, so cannot pay 2s. a lb. for French beans. If this second-rate cook knew how to cook those French beans, or braise those peas, and served them as an entrée, those people would not ask for meat and it would be a great change. They would be just as happy and the cook will not have spent any more.

Suppose you buy 2 lb. of French beans for a party of six, better still 3 lb.; that is 6s. You take a saucepan, 2 onions, slice them, add salt and butter—you must have butter to cook good vegetables, but it pays. Let it simmer. Add two or three tomatos, put in the beans, topped and tailed, and let it all simmer for 20 or 25 minutes, gently moving. Season and put this dish before any meat-eater and once he has tasted it he will be very happy to have a meal of vegetables any day; and I am sure many of you who go on holidays will enjoy that rather than have some frozen mutton, or beef, which is your usual fare! But the pity of it!

We can help you. First-class chefs working in first-class hotels must help you British growers because you are helping them; but those people who will not appreciate your efforts and cannot help you are the second-grade cooks and the majority of housewives; and how that is going to be overcome I do not know. Still it can be done. There are many cookery lectures and demonstrations given, but people will not be bothered to learn, though it is essential.

I will not go on any longer, because I am afraid to make a mess of it, but as I represent most of the chefs of London, I say the British grower can rely on us because not only do we feel it our duty to help you, as we get the benefit of your hospitality, but you are actually helping us to turn over our budget.

The CHAIRMAN: We are greatly interested in your speech, Mr. Bianchi. You only made one mistake when, at the beginning, you said you were no orator.

I now call upon Lady Muriel Beckwith, who writes in the Sunday , Times and other papers. She is going to take the point of view of that individual on whom Mr. Bianchi, I am afraid, rather looks down—the English housewife.

Lady Muriel Beckwith: I have to speak to-day from the house-wife's point of view on the subject of early vegetables. The wonderful display of vegetables in the Hall literally makes my mouth water, especially with the ordinary householder's knowledge that common greens cost 4d. a lb. to-day. I must confess that I am very ignorant of the method of producing these vegetables, but it is the *result* of vegetable-growing that interests me and about which I am to talk.

I was at Covent Garden last week and saw hundreds of baskets of beautiful vegetables coming from all parts of the country. The English lettuces were crisp and hard and, in my opinion, far superior to the great big Spanish ones with long, sad-looking leaves which have to be picked off and wasted. I felt strongly that we *must* use more English lettuces. The food value of English-grown vegetables must surely be greater than that of those grown abroad.

There is one point I would like to stress. Retailers should do all in their power to protect the vegetables when they get them into their shops. They should be protected from heat and the rays of the sun. If vegetables are unattractive concessions should be made in the prices asked for them. If there is one price for every vegetable sold, one doesn't buy the unattractive ones. They don't look appetizing.

I cannot say enough to urge all housewives to try and buy British produce instead of foreign. If they could come here to-day and see this marvellous display of vegetables, they would go away and insist on British vegetables, and the producer would have far more vegetables to grow, and that after all means more work for labour on the ground and a possibility of the horticultural industry absorbing more of the unemployed.

Another point which impressed me in the Show was the packing of all the vegetables. When one realizes that all the packing, everything to do with it, is entirely British, it makes one feel proud that we have taken such strides in the last few years.

To-day everybody is in too great a hurry to eat large meals composed of several meat courses. Salads play a large part in our menus, and one of the most important things that we have still to learn and which most housewives do not know anything about is the cooking of vegetables. The best English food in London is found in men's clubs, and the meals are largely composed of well-cooked English vegetables. But why only in clubs? I am sure many homes are upset because of the eternal boiled cabbage, and bullet green peas which make their appearance, badly cooked, badly served and unattractive in every way. It cannot give anyone any joy to sit down to a meal which looks like that.

I think the public need educating also to a great extent in the use of the lesser-known vegetables, many of which are valuable from a food point of view.

I would like as a housewife to emphasize the fact to the grower that it is quality more than size that we really do like. One would always go for a *little* cauliflower, because it is sweeter and more delicate than a large lumpy one. That is a point we ought as housewives to try and help ourselves in—getting a better quality. The larger vegetable does not go further, because it is left and wasted.

The CHAIRMAN: We shall now listen to Mr. Shearn, who conducts a retail business—a very flourishing one—in the Tottenham Court Road.

Mr. W. B. Shearn: As retailers of vegetables we welcome the strides that have been made in the growing of early produce. When one examines the marvellous display of the many varieties we have seen, we feel it is a great step in the direction of meeting foreign competition. But the produce *must be good*, it must be consistent in

quality and reasonable in price. This is the finest show of English grown early produce we have ever had, and it is very gratifying to see the advantage the growers have taken of the help given them by the imposing of tariffs on these foods.

We must remember that many of these vegetables are only early when viewed in the eyes of the producer, and that so far as the public and distributor are concerned, they are part and parcel of the "all-the-year-round" diet. This is particularly true of salad vegetables, and we can trace much of the popularity of salads to-day to the fact that they are available at practically all times; that we are not merely dependent upon the produce of the early market-garden at home.

In the eyes of the English grower this may sound an unfortunate fact, and he may well dislike the appearance of the foreign article upon the market a little before his goods are ready, and complain that his rival therefore "creams" the market. I should not say for one moment that this is not so in some cases. We all know what the grower has to contend with in weather conditions, but in these days where science has made such strides it will become increasingly easier for the home growers to compete successfully. Now the public must be able to procure at regular intervals produce equal in quality to the last supplied. He or she should be able to say "same again, please," and within reasonable limits the retailer should be in a position to oblige.

The retailer's trouble to-day is that he is not able to procure a continuity of supply of properly graded and packed early market produce at a consistently economic price. We have at times a glut at prices which are of no good to the grower or the distributor, whilst at the same time the public are suspicious on account of their cheapness.

We had a show of pineapples at 3s. 6d. one day which were worth 1s. 6d. a week later. The housewife, instead of being pleased, said, "Are they good? Will they keep?" So I said, "We are giving ourselves trouble for nothing," and I charged an extra 6d., and the housewife lost that sum but believed in the pineapple.

At the other end of the scale we have exorbitant prices for inferior produce, as was demonstrated a few weeks ago when packages of Cornish broccoli were marketed and sold at high prices. Because of the consistent demand for this article, retailers were forced to buy, and in many cases sold at considerably less than cost price in order to keep their trade together.

It is not sound business, that at one time the grower should find the trade unremunerative, whilst at another the grower should suffer equally. Consistency in quality, not only in production, but in packing and presentation, will mean greater stabilization in prices, and, provided the British grower is not too ambitious in his ideas, and is satisfied with a fair return, there should be no difficulty whatsoever in absorbing much greater quantities than are at present being grown.

The British public to-day demands quality. They simply will not buy heartless lettuce or cabbage. I am convinced that a large

majority of the British growers is not aware of the poor quality of their vegetables, because they have not sought the opportunity of comparing their produce with that of others.

The retailer has the opportunity of comparing not only the produce of growers in this country, but also with continental supplies. I am positive that if growers had the same experience they would soon be amending their assessment of the quality of their vegetables.

I would suggest to the grower that he should come up to London overnight, and go early to the market in the morning, compare his own produce with others, and learn much from the experience. By such visits he would gain fresh ideas, and would realize that by giving more care to grading, packing, etc., he would add largely to his reputation and incidentally to his pocket.

I have been in the greenhouse of a grower friend, and have seen him point with obvious pride to his early lettuce, and boast as to its high quality, whereas, in my estimation, it was absolute rubbish compared with what I had bought in the market on the previous day. This is a very big point. Growers must see their stuff as others see it—in the same circumstances—as one of many.

The retailer would prefer, all other things being equal, to sell and the public to buy home-grown early vegetables in preference to the foreign article, but to be quite honest, far too frequently all those things are not equal and quality is the main trouble.

Less individualism, more collectivism, the interchange of ideas and, last but not least, greater contact with the distributor than in the past, is what is demanded. I think that there should be more opportunities like this when the grower can place his difficulties before the retailer, and the retailer in his turn can expose his troubles.

Remember the retailer is but the agent of the housewife, and I can tell you quite frankly and without fear of contradiction that Mrs. Housewife demands quality.

Following up my remarks concerning growers, I do not wish them to feel they are the only offenders. I have travelled practically through America and all countries on the Continent, and have made it my business to attend early morning market in the towns I have visited. I find there growers are just the same as the English ones—goods packed without question of grade, etc. The Commission Agents buy up large consignments, sort, grade and pack carefully for dispatch to foreign and other markets, leaving the inferior produce for local buyers, as they realize unless only the best stuff is sent they cannot command the prices they do.

The grower who has the retailer's sympathy is the one who writes to the papers a pitiful letter that he sent fifty boxes of lettuces and only received Ios. for them.

I am now going to put myself in two places (showing a box of lettuces), taking the part of the housewife and of the salesman.

Mrs. Housewife No. 1: I would like a good lettuce.

SALESMAN: Certainly, Madam.

Mrs. H. (picking over the lettuces): Yes, I will have that one. (Picking them over again.) I will have that one too. That is two. Will you send them for me, please?

S.: Certainly, Madam.

(Enter Mrs. Jones, Housewife No. 2.)

Mrs. Jones: I want a nice lettuce, please.

S.: Certainly, Madam; this way.

Mrs. J. (picking over the lettuces): I will have these two, please. (Enter Mrs. C., Housewife No. 3.)

Mrs. C.: I want a nice lettuce. Have you got any?

S.: Certainly, Madam.

Mrs. C. (picking over the lettuces, pinching the hearts, pulling them open, throwing them down): Haven't you anything better than that?

(Salesman fetches up another box and Mrs. C. picks out two of those.)

The salesman buys these at 6s. a box and is supposed to make a fair profit at 4d. each. Four lettuces are taken out of box No.1; the rest are no good. These boxes were bought at Covent Garden this morning. How can you make a profit? Yet the producer writes and says that you are a profiteer! In this second box are the lettuces we want—every one graded beautifully, packed properly. I don't know who these growers are; they were bought by my buyer this morning and I told him not to put any names on the boxes, but if anybody here recognizes them. . . .!

I don't know if growers will take it in the spirit I mean. I hope they will go on growing lettuces like those in the second box and be happy afterwards.

I have been speaking as a retailer, but now I am a grower too. I have done as much as I can in retailing and, as growers, we are going to try and keep up to the standard of this second box. I hope the Government will keep the tariffs on, and I hope you will be able to pass it on that we are doing the right thing.

The CHAIRMAN: I next call on Mr. G. S. LANCASHIRE, representing the wholesaler, who as a broker handles a large amount of vegetables sent to the Smithfield Market, Manchester.

Mr. Lancashire: When I was asked to contribute to this discussion I wondered what on earth of value I could say regarding the quality of early vegetables, because the only quality that concerns us is the saleable quality and its remunerative value, and if I were to talk about the relations between grower and distributor, the necessity for closer co-operation and better packing, I should only be repeating what has been said many times at these Conferences, and in particular what Mr. Secrett has said, he being as much an expert in his knowledge of salesmanship as in the art of producing. Therefore I am limited somewhat to reflections on the trade of early vegetables, in the importation of which I have been interested throughout my business career.

I am glad that the wholesaler has been invited to this discussion, because it was not very long ago that the wholesaler was called a

"middle man." He was an unnecessary evil; in fact, he was the vampire that sucked the blood of prosperity from the honest and hard-working grower. Now, however, I think it is realized that he is a necessary cog in the wheel of progress.

But I would just like to make a few observations with regard to these vegetables. With the notable exception of lettuce, there has been a decided decline in the consumption of early vegetables in this country. In pre-war times there was a comparatively good demand during the winter and early spring for the following vegetables, of which daily supplies were received: Paris green lettuces, asparagus, endive, salsify, globe artichokes, peas, French breakfast radishes, Jersey beans, Nigger beans, those delightful succulent French beans almost unknown to the present generation, which have no sale now because there are black spots on them. The consumer to-day buys through his eyes. Many prefer the big, coarse Spanish lettuce to the succulent variety which is grown at their very doors.

On the resumption of trade after the war there was a considerably lessened demand for these articles, and a tariff, erroneously called a luxury duty, was put on them, which does want to be discouraged.

As far as the provinces are concerned, the trade is now insignificant. The lessened demand is due to three reasons: decrease in private entertaining; increase in canned vegetables; and the break-up of the cultured higher middle class who have of all probably suffered economically the most. There has been a change-over in society, probably as great as that in the time of the Industrial Revolution 100 years ago. It is now the business of the producer and the distributor to create anew the demand for these delicate vegetables as a change from the dreary round of Brussels-sprouts, cabbages and cauliflowers; in fact, to create a refined and appreciative taste in gastronomy.

There must be a closer and more intimate relation between grower and salesman. They need opportunities to realize each other's problems and difficulties. The growers should make periodical visits to the various markets to study the packing and appearance of the goods displayed there. The Continental producers are always asking advice on packing and presentation and the appearance of their goods, now and again sending new varieties of fruit and vegetables to ascertain if there is any demand for them. Not content with this, from time to time delegates are sent here to visit the more important markets of the country to see for themselves how their goods were marketed and the condition in which they arrived. They could also find out suitable firms to whom they might send their produce. I have seen strawberries making Ios. to I5s. a lb. sent to salesmen who knew nothing of the value of luxury fruit, and had not the class of customer who could buy them at the market price. Though that is an extreme case, it happens oftener than it should. The grower cannot reap the full reward of his arduous labours unless he knows the best channels of distribution for his produce.

Our concern, however, is with the demand for early vegetables which can only be attained by advertising and still more advertising. The public are wanting more variety in their vegetables, and it can be given them; but they must be told about it and told often. The enormous increase in the consumption of fruit in post-war years is due to the Eat More Fruit campaign and the continuity of supplies at moderate prices. Fruit eating has become a habit which has been maintained because there are supplies to encourage it.

The Dominions spend thousands of pounds a year, in which the importers of this country take a share, in persuading the public to buy their fruit; and if the English grower of vegetables wishes to have a good and rapid sale for his produce, he must be prepared to advertise on a much larger scale than has ever been done. A conference should be arranged of all the bodies concerned, and I am sure a scheme could be evolved, given the willing support of all parties, which would be of incalculable benefit to the vegetable growing industry of this country.

In conclusion, I would like to give the results of my observations in various parts of England. I may be wrong in my surmises, but there seems to be a rising feeling of discontent against the selfsufficient schemes of the Ministry of Agriculture. They are interfering, it is said, with trade, and with the arranging of trade agreements with other countries, costing large sums of money, while the restriction of imports is a cause of resentment in the Dominions. may be that in any reaction the growers of fruit and vegetables may find themselves in an unprotected position. There is, however, to-day an awakened and enlightened spirit in horticulture, and, by making full use of their opportunity, I hope growers will establish such a firm hold on our markets that they will have little to fear from the competition of foreign countries.

The CHAIRMAN: I now call on Mr. SECRETT. There have been a certain number of suggestions and hints to the growers, and I hope he will be able to reply to them. At any rate, he will give us interesting information on how it is done, because he is one of the largest cultivators of early and other vegetables.

Mr. Secrett: I had hoped that I should be a listener here to-day. and I feel that there are others more qualified to speak on quality than There are many firms who are deeply concerned in doing everything possible to improve the standard of our packing, and horticultural shows such as we have here to-day are of very great educational value.

Speaking mainly from the growers' standpoint, it is necessary that I should first point out that it is only the very best foreign produce that is shipped to our markets, as this is bought by agents and they only buy that of high quality, the poorer quality vegetables being consumed in their country of origin. I myself have sat in the auction pools in Holland and seen barge after barge of aphis-infested lettuce go through unsold, until a barge came into the pool with good lettuces on it which were bought by an agent. We in England have to compete with that sort of thing, and we have got to find a market for our poor

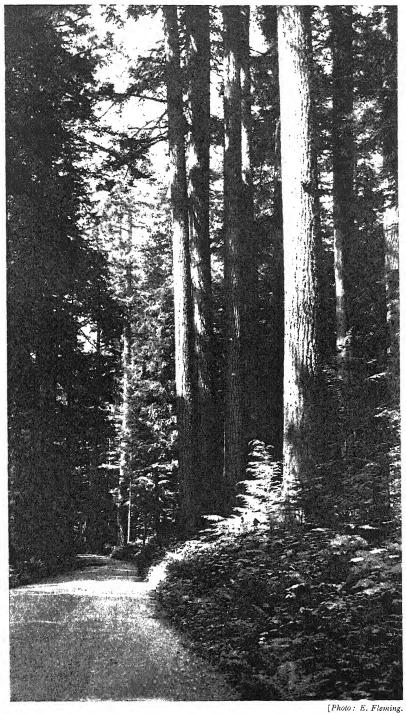


Fig. 130.—Douglas Fir and vegetation on Pacific Coast, southern British Columbia.

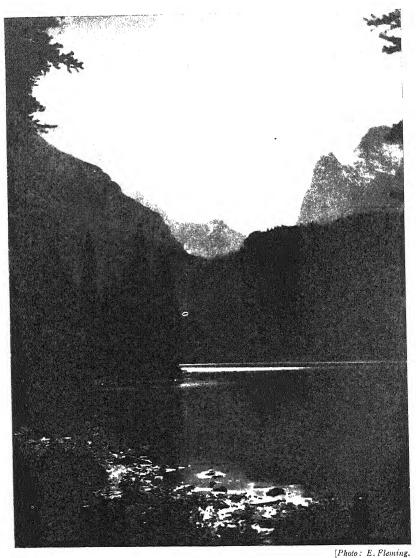


Fig. 131.—Lake in Rocky Mountains of British Columbia.

quality vegetables. It is no good; we cannot throw all the poor quality vegetables away; a market has to be found for them. We must, therefore, disabuse our minds of the fallacy that foreign horticulturists are superior to the British, as I for one look upon the British horticulturists as leading the world. Certainly, foreign countries have an advantage over us, as the labour employed in producing abroad is virtually slave labour, the foreign peasant, his family and children working from 4 in the morning to 10 o'clock at night.

Reference has been made here to-day to the superior quality of foreign vegetables. You cannot say that any one grower in this country is the finest grower of apples, tomatos or lettuce. We all have good stuff at different times. No one man is at the head of the trade. At one time this man's lettuce is best; at another time that man's sprouts are best. It all depends on the conditions that we have to face at the time of planting and during the maturing of the crop. All this applies exactly the same to the foreign goods. There is no foreign tomato to touch the English tomato; it is the finest in the world. There is not a foreign apple to touch the English 'Cox's Orange.' Take that really wonderful vegetable, natural seakale. It is only on the market for three weeks of the year. As you know, it comes in at the end of the forced seakale season, and this natural seakale, which has to be cut as soon as it appears through the ground, has a market of three weeks.

Mr. Shearn has been talking about people going into his shop and handling his lettuce. In regard to natural seakale, greengrocers are liable to buy a box and put it under the counter, ready for one man or woman, who comes in for I lb., and there it stops. It is only at the end of the three-weeks season that the public realize that there is that vegetable at all; indeed it is not unusual for salesmen to bury it for three weeks, and wait for the price to go up. Retailers may help us in that way. I have nothing against retailers, but as I go round, I often think if only retailers once a month would give the English grower an English exhibit in his window, what a help it would be. We see these highly polished and highly coloured foreign crops and a little English stuff mixed up with it, but in regard to English vegetables, you very seldom see them presented in a nice way in the shops. They are left out in the sun; they lose their moisture and the quality is gone.

Again, we have to bear in mind that in times of shortage, brought about by adverse climatic conditions, there is a demand for vegetables of not too high a quality. For example, take the Broccoli this year: adverse weather conditions had affected the crop all over Europe—not only in this country—and, at the beginning of the season, Cornwall had to market broccoli of inferior quality, whereas that which has been arriving from Cornwall during the last month has been of a truly high standard. You cannot blame the Cornish growers for marketing that broccoli. The fault was to market a low standard product in a way suggesting that it was a high standard product. If you are going to sell a low standard thing, let everybody see that it is a low

standard. That mistake was only made by a few Cornish growers; but the outcry was against the whole of the Cornish industry.

I have also found that during very hot weather, English lettuces of inferior quality have fetched much higher prices than when we are selling a very good lettuce. It is very hard to produce good lettuces when temperatures are very high and there is little rain. Irrigation plant costs money; 86 acres cost as much as something between $f_{2,500}$ and $f_{3,000}$, and it is not every grower who is able to produce that. The margin of profit is so small in our industry that it is very difficult to find money for improvement. That is the general condition of our industry all over England, and when we do get a penny or two we are foolish enough to put it back into the land. Market growers when they make a penny or twopence do seem to improve their land; that is the true condition of horticulture in this country to-day. It is necessary to have the land well equipped, cultivated and irrigated, and the growing industry to-day is practically living from hand to mouth.

Early vegetables must be produced under glass, and during the last two years the industry has expended a vast sum of money in putting down glass and cold frames, and provided we receive adequate protection, I am sure this work will continue. Now in England there has always been more demand for large coarse vegetables. "Little and good "has not been fully appreciated, but vegetables can be small for two reasons:

- (I) Because they are badly grown on poor land, starved of manure and water. Those are bad vegetables.
- (2) The question of strains.

There are large strains and there are small strains. On the Continent growers have largely gone in for the smaller strains of vegetables. In England the trade has demanded large strains, and we as growers have to supply what the trade demands. For myself, I should choose a cauliflower such as 'Presto' or 'Pioneer.' In the majority of vegetables the smaller strains are the better quality.

There is another factor which comes into this question of quality and size, and that is the efficient use of top dressings, as much can be done to improve the flavour of vegetables in this way. If potash is used in a sensible way, colour and flavour can be improved, but heavy dressings are not necessary, for a heavy dressing of potash will make a crop late. From my practical experience I have come to the conclusion that the best vegetables are produced on land which contains a large amount of nitrogen, but that nitrogen must be balanced by the use of a little potash, but not too much. I do not believe in 2 cwt. of potash to the acre, but in I cwt. I think high dressings of potash are dangerous. because they lose you the first fortnight of your market. You will be a fortnight later than your neighbour who has used no potash at all.

It takes a generation to turn farm land into good vegetable-growing land, and in these days when towns are expanding so rapidly the

vegetable growers are forced out of their holdings into poor and derelict farms, and it naturally takes them some time to build up land capable of producing good vegetables.

I often feel that I would like to settle on one farm and stop there for the rest of my life. On one occasion I bought a farm, and it was my idea to stop there and spend the remainder of my days in that farm, but I was forced out by a local authority, but, being fortunate, found a very good farm close by. If I had not found that farm I do not know where I should have gone.

One other matter: Mr. Lancashire made the suggestion that the National Farmers' Union should call a Conference between producers, retailers and wholesalers in regard to this question of vegetables, and I think it would be a very good thing if it were called. The National Farmers' Union, rightly or wrongly, is engaged to-day with one thing, and that is marketing schemes. The discussion this afternoon is not on marketing schemes and there I leave it; but until the National Farmers' Union leave marketing schemes alone they will have time for nothing else. We need an organization to study the very things Mr. Lancashire has mentioned, and I say the National Farmers' Union ought to be doing it.

I believe in the National Mark. I think it is the finest way of backing the British grower, but I have one thing against it. It is not severe enough. Those lettuces you have seen are up to National Mark standard—2 ounces.

SOME ALPINE PLANTS OF BRITISH COLUMBIA.

By J. C. BENNETT.

In a rash moment I undertook to write an article for the Journal on the alpine plants of British Columbia, forgetting that such a subject was too vast to be dealt with in the available space without danger of slipping into mere generalities or of the article consisting only of a long list of useless names. It seems better to try to give an impression of the alpine districts of a small area which I know best and which I can now remember in the absence of notes rather than to try to deal with the whole country. What information of interest I have as regards two of the more outstanding genera has been added.

Perhaps a short account of the physical characteristics of this large province—roughly equivalent in size to Great Britain, France, Holland, Belgium, and Denmark—may help to explain why the number of native species is so great and why many of them are difficult to grow under the more or less uniform conditions of lowland gardens. The country forms part of the Cordilleran system of mountains which extends from the Andes of South America as far as Alaska. The eastern border of the province is formed by the Rocky Mountains, which have an average height of 8,000 feet and peaks running up to 15,000 feet. A narrow valley separates this range from the Columbia Mountain system, which is composed of the Purcell, Selkirk, and Monashee Ranges and dividing valleys; the Cariboo, Peak, and Stikine Mountains in the north.

Between the Columbia Mountains and the next range to the west —the Coast Mountains—is a wide region of plateaus and low mountains. The Coast Mountains are wide and very rugged, of from 5,000 feet to 8,000 feet in height, running parallel to the Pacific. Beyond this again is the Insular Mountain system, which is partially submerged and now forms an archipelago of which Vancouver Island and the Queen Charlotte Island group are the largest of many hundreds of islands. The former island has a backbone of mountains rising to over 7,000 feet, never entirely free from snow. In southern British Columbia the line of perpetual snow is at about 10,000 feet.

In a country as broken by mountain chains as this the climate must vary greatly according to local conditions, apart from the variation due to altitude. The prevailing wind is from the Pacific, warmed by the Japanese current, and the moisture it bears gives rise on the coast to an almost sub-tropical forest growth of fir and cypress, so dense that it is only penetrated with difficulty. As the air currents deposit most of their moisture on the western slope of the Coast

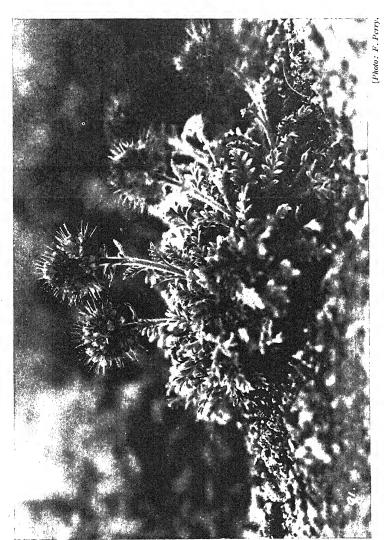


FIG. 132.—PHACELIA SERICEA.



Fig. 133.—The ridge, just under the furthest peak, where Polemonium confertum grows.

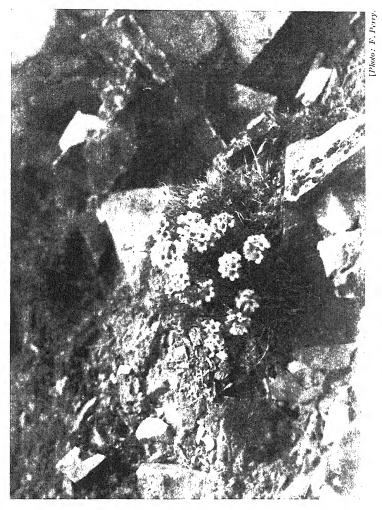
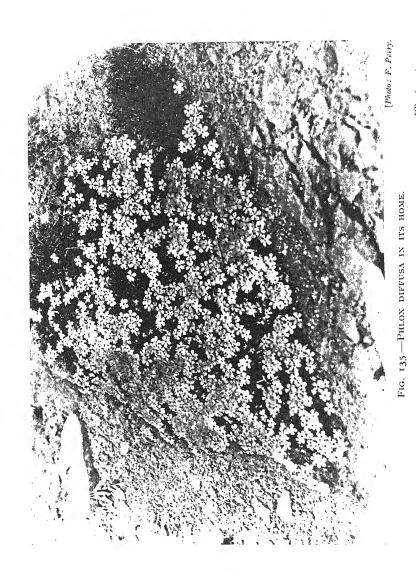


Fig. 134.—Polemonium confertum in its home.



[To face p. 347.

Range, very dry conditions are caused in the country beyond, which is consequently named the "Dry Belt." In this way a system of wet and dry belts is set up throughout the province, bringing about changes in the character of the flora. Temperatures in the province vary from 50 degrees below zero in the north to zero for short periods in the warmest part of the south, so that all plants are hardy as far as temperature is concerned in England and Scotland. Of all this area very little can be gathered from the botanical descriptions which exist, and which generally refer only to plants from the southern part of the province. It is only possible to guess from the small collections sent in by surveyors and others that in the north, arctic and southern plants meet, with an occasional endemic species. Even in the more settled areas, new species occasionally turn up and new information as to older species is continually sent in by collectors, and it is doubtful if the complete life history of any species has been worked out. This is not due to lack of interest in plants, but chiefly to the great difficulty and cost of travel in a country so rough.

In the Coast Mountains there is an area of some 300 square miles composed of alpine peaks, meadows, and lakes, rising to an altitude of 8,000 feet. For British Columbia it is fairly accessible, as it is only about a day's journey from the town of Vancouver and has a trail cut through the dense lower forest-thirteen miles long, it is true, but without encountering any great difficulty. The trail starts in the usual coast tangle of Douglas and balsam fir, cypress, devil's club, many species of Vaccinium (including a beautiful compact form of V. parvifolium with larger coral berries very freely produced), Scouler's willow, and bracken. In wet hollows Lysichiton kamtschatcense throws up its yellow spathes by the hundred, followed by 3-foot leaves which give a tropical look to the forest. In places where the shade is too dense for shrubs many genera of the Lily and Ranunculus families occur: Smilacina, Actaea with red and white fruit on separate plants, Maianthemum, Clintonia uniflora, Disporum oreganum, and three species of Streptopus. Chimaphila umbellata is common in welldrained shady places, but the other species—C. Menziesii—is rather rare. Pyrola bracteata, P. chlorantha, P. picta, and P. secunda are more or less common. There is no difficulty in growing any of the species from this zone of plant life—though some few are not easy to establish—if it is remembered that they all need frequent dressings of coniferous leaf-mould to give to the soil the condition of acidity they require.

At 3,000 feet the Douglas fir and most of the plants from the lower slopes give place to the hemlock in association with such shrubs as Cladothamnus pyrolaeflorus, Menziesia ferruginea, Pachystima Myrsinites, and the trailing brambles Rubus pedatus and R. nivalis. Cornus canadensis is at its best in this zone.

The hemlock disappears at about 4,000 feet into a mixed growth of Abies lasiocarpa, Tsuga Mertensiana, Pinus albicaulis, and Chamaecyparis nootkatensis, with Rhododendron albiflorum as the most

conspicuous shrub. The last two trees reach the highest screes, where they are reduced to a foot or so in height, and are the last encountered in this range of mountains.

The trees now thin out to give a park-like effect with the open spaces covered with the pure white Cassiope Mertensiana and the rose-purple Phyllodoce empetriformis in the same profuse way as heather in Scotland. Sanguisorba sitchensis, Trientalis arctica, Spiraea densiflora, and one or two unidentified Violets occur in moist places.

The country opens out still more to give a view of the massed colour effect of the alpine meadows in July—the yellow of Mimulus alpinus, the blue of Lupinus arcticus, the crimson and scarlet of the rootparasites Castilleja miniata and C. angustifolia against a background The mosses-many are rare-are numerous enough for their varied shades of green to add to the colour scheme. Dozens of little streams run down the meadow slopes from the snowfields above, each a picture of natural beauty impossible to reproduce in lowland gardens. Growing almost in the water of such streams are Saxifraga Mertensiana, Mimulus alpinus, and many small plants which are pretty in their natural setting but not of any horticultural value. Mimulus Lewisii and Epilobium latifolium, both with purple-pink flowers, grow in profusion on the drier banks of the larger streams. very clear-coloured white form of M. Lewisii was found on Vancouver Island ten or more years ago. Epilobium luteum also occurs along the streams, but it has not much garden value. In moist peaty places Trollius albiflorus is local but numerous as to individuals. It has cream flowers about 13 inch across. On dry slopes and shaded by grasses the minute shrub Gaultheria Myrsinites, with evergreen leaves and scarlet fruit, is rare and owing to its root system difficult to collect, and on the dry sunny slopes was one patch of the creeping Vaccinium oreophilum, here far outside its supposed range. Everywhere the small yellow Erythronium grandiflorum var. Smithii is in bloom as soon as or even before the snow has completely melted; as also Ranunculus Eschscholtzii, a pretty dwarf buttercup with comparatively large flowers, which can be found with its foliage bleached white by the snow covering, but already in full bloom. It is impossible to mention in detail all the other plants with which these meadows are covered: Arnicas, dwarf Asters, Petasites frigida, Phlox diffusa, Erigerons, two or three dwarf species of Ranunculus, the stately Veratrum viride, a sub-species of Aquilegia formosa with larger flowers than the type. dwarf Vacciniums, and many other plants which I have now forgotten. Curiously enough in this land of Pentstemons only one species could be found, and that was far from common—P. confertus coeruleopurpureus, to give it its old name instead of "lumping" it with the northern P. procerus. Where the vegetation begins to disappear and the high screes start, Phyllodoce empetriformis reaches its altitudinal limit, its place being taken by P. glanduliflora, a species with small cream flowers. Here are occasionally found clumps of P. intermedia, a natural hybrid of the two species, with a pink subglobose corolla.

The reverse cross is recorded under the name of *P. hybrida* and has cream flowers, but I have never seen it.

The plants of the high ridges seem to be difficult to grow in lowland gardens, or, if they can be grown, to lose most of their characters which make them so attractive in Nature. They are more suitable for the alpine house in a moraine mixture free from lime and shaded from the midday sun, but even then they are not very satisfactory. Aplopappus Lyallii is a beautiful small plant with bright yellow flowers 1½ inch across and apparently closely related to Erigeron aureus; Solidago corymbosa is a goldenrod reduced to 2 inches in height; Phlox Douglasii forms compact clumps completely covered with pale lilac flowers; Silene acaulis occurs in wide masses with colour variations of pure white and deep crimson, and seems to be more freeflowering in gardens than the European plant; Erigeron compositus is found in its rayed and rayless forms, and there was one unique plant with 6-inch flower-stems and larger foliage. Phacelia sericea (fig. 132), is a really beautiful plant with silky foliage and cymes of purple flowers with long exserted stamens—a pity indeed that it loses most of these attractive characters in gardens. Anemone parviflora is a pretty little species with a liking for growing through the creeping willows, Salix nivalis and S. reticulata. Several species of Castilleja reach this altitude, and Erigeron salsuginosus becomes a dwarf with the same large flowers now coloured a beautiful shade of lilac instead of the comparatively dull and tall form of the lower meadows. Kalmia glauca microphylla is a very small evergreen shrub with deep pink flowers, found on hummocks in wet peat surrounding one of the many

The northern slopes of these mountains at 7,000 feet are permanently covered by snow fields or glaciers and the few rocky ridges which exist are barren of plant life. Cassiope Mertensiana grows to within a few feet of these snow fields wherever the summer shrinkage is sufficient, and frequently there is a belt of dead old plants which have been killed during some exceptionally cold summer when the snow covering failed to melt. The small fern, Botrychium Lunaria, was found on a ridge at this same altitude growing in association with the pretty little Stellaria laeta. The ridge just below the 8,000-foot peak in the far distance shown in fig. 133 deserves to be mentioned, because on it the rare and beautiful Polemonium confertum is found. Fig. 134 shows a fine specimen of this plant, which has deep blue flowers, and I hope the plant is still where it was left after the photograph had been taken. Unfortunately, P. confertum is neither easy to grow nor to bloom in gardens, and, if it does bloom, loses most of its attractions. On the same ridge were individual plants of Loiseleuria procumbens a yard or more across; Campanula rotundifolia reduced to 2 inches but with flowers increased in size, and the two "pioneer" plants—Saxifraga Tolmiei and Carex nigricans.

The flora of this area is varied, but many fine plants which one might expect to find are missing. The orchids are poorly represented

by two small species of Listera, *Habenaria borealis*, and very few clumps of *Calypso borealis*. With the exception of those already mentioned, and a few plants of *Viola glabella*, the Violets hardly exist at all. It is difficult to explain the almost total absence of Pentstemons. In British Columbia there are only three species of Lewisia, but in these mountains they seem to be entirely absent, although *L. columbiana* is common on the Vancouver Island mountains not so far away.

This mountain area is, or used to be before there were too many visitors, the home of the grizzly and black bears, the panther, the wild cat, the wild goat, and the elk, all so shy that they are rarely seen even in the distance. The marmots, ground squirrels, an occasional eagle, and arctic owl and a few other birds are the only animals encountered. One species of humming-bird summers on the high ridges and presents an incongruous sight when seen flying over the snow fields. mosquitoes and deer-flies very nearly spoil the pleasure of the trip as they make it necessary to wear a veil and to sit in the smoke of a smudge fire when resting or eating meals. The entomologist of the Victoria Museum was making a collection of the insects which are peculiar to the alpine districts and had exhausted himself in chasing them up and down the steep slopes, and consequently he seemed pleased when he discovered that specimens could be picked up on some of the narrow snow fields, which they had tried to cross and been chilled in the attempt. In this way he obtained a very fair collection, including three species new to science.

PHLOX.

Some of the small Phloxes of north-western America are, to my mind, the most attractive of all mountain plants for lowland rock-gardens because most of them can be grown without glass protection in any climate with pure air, and, if anything, they are more free-flowering than in their natural homes. In The Flora of the Rocky Mountains and Adjacent Plains, by P. A. Rydberg, twenty-six species are described, but it is unlikely that more than ten have ever been tried in any garden. Even P. diffusa and P. Douglasii, the most common species in Nature, are still uncommon in gardens. This is chiefly due to the fact that many of the species are confined to inaccessible regions in the wilder parts of the West, so that their collection would entail a great deal of expense. There are few true alpine species, the majority being found on dry slopes of low mountains and dry plains. Only the following five species are known at present to occur in British Columbia.

P. diffusa (fig. 135) and P. Douglasii.—These two species seem to pass indistinguishably into each other so that it is extremely difficult to separate them in accordance with their stated botanical differences. Certain plants seem to be more spreading and common than others, and there is a good deal of variation in the shape of the flowers. Both

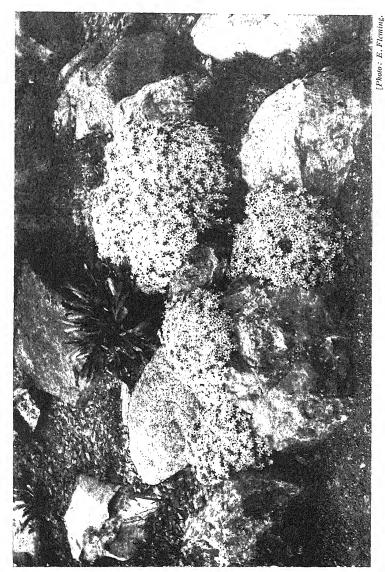


Fig. 136,---Phlox caespitosa and Lewisia Cotyledon in cultivation.

[To face p. 351. Fig. 137.—Phlox speciosa and Echinocereus viridiflorus in cultivation.

species are fairly common in most of the mountain ranges of British Columbia, growing from above the tree limit to the higher alpine ridges. The colour of the flowers is generally a pale lilac, sometimes even white, not particularly attractive, but the manner in which the plants take the shape of the surface over which they grow is attractive in the extreme. In one small alpine area in central Vancouver Island these species are found in quite decided colour variations which were collected some years ago by the late Doctor Stoker. All are good and include a bright pink, pure white, lavender, and these colours with "eyes" of different shades and petals of different shapes. One plant with flowers of a deep lilac-purple shade was found. In gardens both species cross freely with *P. subulata* and produce hybrids which are ugly to my mind, but perhaps I am prejudiced against artificial hybrids in the rock-garden.

- P. caespitosa (fig. 136), is a very dwarf species which seems to have spread to the lower mountains of British Columbia from Utah in the south. The flowers are pale lilac. The plant is easily grown in gravelly soil and is one of the prettiest species.
- P. rigida.—Another species apparently of the same type as P. caespitosa and which has reached British Columbia from the dry mountains to the south. I have no knowledge of the species except that derived from one plant which arrived in full bloom. From this it seems the flowers are whitish with a very long corolla tube. The habit is very dwarf and compact and the leaves similar to those of P. caespitosa.
- P. longifolia.—A rather thin, weedy species of about 12 inches in height and with lilac flowers, quite common on the plains of the dry interior country. It is easily grown but not particularly attractive.
- P. speciosa (fig. 137) has a range centred in eastern Oregon and there is some doubt as to its occurrence in British Columbia although it has been reported. It is a beautiful deciduous plant about 6 inches in height with rose-pink proportionately large flowers which are deeply cleft. It will live for years in dry hot situations, but any disturbance of the roots is fatal. The only way to increase the plant is from seed, which is difficult to obtain.

Perhaps the result of trying under cultivation some of the other dwarf species, although they are not found in British Columbia, may be interesting. $P.\ condensata$ comes from the very high ridges of Colorado and has small white flowers on a very compact ball of foliage. The annual growth is $\frac{1}{8}$ inch or less. The minute cuttings rooted the first year after the plants were collected but refused to do so subsequently, perhaps owing to loss of vitality in the plants under cultivation. No seeds were set or obtainable, so they died out slowly. $P.\ Hoodii$ is a very small species, easily propagated by division, from dry banks on the prairies of Alberta, and has small white flowers. $P.\ alyssifolia$, which comes from the low mountains in Montana, is about 3 inches high, with large pale lilac flowers and hard dark green

leaves, and is also increased by division. *P. multiflora* has much the same habit as *P. Douglasii*, but the leaves are long and spiny and the flowers slightly larger. It is a native of Colorado on the lower slopes of dry mountains. It is propagated with some difficulty from cuttings. A dry, well-drained place in light soil and full sun seems to suit all these Phloxes. Several other species have most attractive botanical descriptions, but it will be some years yet before they can be tried in gardens.

PENTSTEMON.

Of the 150 or more described species of this genus only twelve are said to occur in British Columbia. Of these twelve I do not know the true P. Lyallii, P. glaucus, and P. triphyllus. P. deustus and P. confertus are dingy plants with small dull white or yellowish flowers, which are not worth growing in gardens. P. ovatus is about 3 feet in height with purple flowers which look well when massed in the wild garden, but otherwise is far from attractive. P. procerus is a foot high with rather dull pale purple flowers. P. humilis is much better, being dwarf and having flowers of rich purple, not large individually but freely produced on the stems. P. diffusus is a leafy species with small rather dim purple flowers, but the white variety is good in colour and a better garden plant. P. confertus coeruleo-purpureus A. Gray is now combined with P. procerus, though it is a much better plant from a gardening point of view. It has bright purple flowers in clusters on stems of only a few inches, and is found on dry slopes of the Coast Mountains at or just above timber line. All these species are quite easy to grow in well-drained soil and in full sun.

P. Menziesii is a very different thing, providing, in one of its varieties at least, a rock-garden plant of the first merit. It is a prostrate species forming dense mats of evergreen foliage on woody stems, which root along their under surfaces. The leaves are oval, the flowers tubular and generally lilac-purple, though both leaves and flowers vary to some extent in different localities. The varieties are generally easy to grow in the rock-garden in positions suitable to Pentstemons.

Only one variety is recognized in botanical works—*P. Menziesii* var. *Davidsonii* Green, distinguished by its entire leaves. It does not seem to be very free-flowering.

The most ornamental of all the forms is one sent me from the Selkirk Mountains, I believe, or from some other range of mountains in the interior of British Columbia, and now grown at Kew under the suitable name *P. Menziesii* var. *microphyllus*. It is a very free-flowering form, with flowers of a pretty shade of pale lilac-purple, rather smaller than in the other varieties. The leaves are considerably smaller, more toothed and of a dark fine shade of green.

The type plant is common on the mountains of Vancouver Island, generally above the tree limit, growing in well-drained sunny crevices. Two years ago a white variety was found by Mr. LAYRITZ, of Victoria, on one of the Vancouver Island mountains, but unfortunately was

lost during the rough descent. As I should probably have heard if it had been found before or since, I gather that it is extremely rare, or perhaps unique. There is a curious history attached to this plant which is perhaps worth mentioning. Apparently it was first collected by Archibald Menzies, who was surgeon-botanist on Vancouver's expedition to the North-west Coast, 1790-1795, at "Nutka" (now spelt Nootka) on the west coast of Vancouver Island, the headquarters in those days of the trade in sea otter skins. In Nootka Sound there are small islands on which a larger form of P. Menziesii is still found in some quantity and apparently fully acclimatized to its strange conditions at sea-level. It shows variation in the larger size of its leaves and flowers than those of the plant found at high altitudes. and the latter are of a comparatively dim, rather ugly lilac-purple. The plant has the somewhat unexpected characteristic of being more difficult to grow than the alpine in the average garden. Menzies' specimens, which are at Kew, show no variation from the mountain plant, a fact that may prove there has been variation in the plant since his day, or, perhaps, that his specimens were not actually collected at "Nutka," since he is most unlikely to have reached the nearest alpine districts from that place, both on account of the difficulty of penetrating the bush and the hostility of the Indians.

P. fruticosus.—A small shrubby species, with lanceolate leaves and the usual lilac-purple flowers, which is found on dry ridges of the Selkirk Mountains. It is attractive in gardens, where it needs more shade than the majority of Pentstemons.

P. Scouleri.—This handsome species is common on the low hills or the dry interior country of British Columbia, but its range is restricted to a comparatively small area. The plant has a more or less upright habit of growth, with long narrow leaves and lilac-purple flowers, which are larger than in most of the other species. P. Scouleri is very easily grown in light soil and prefers almost desert conditions. White varieties are fairly frequently found, most of them not being of very clear colour. A really beautiful pink colour variety was found by and named after Mrs. Rutherford, of Nelson, B.C., a few years ago, which, in gardens, grows well, is very free-flowering, and proves to be of the greatest merit.

Before concluding this slight sketch of a few of the plants of British Columbia, I should like to mention a rare Pentstemon which may some day be found in that country, as it occurs in the adjoining State of Washington. It is *P. Gairdneri hians*, known only from two or three wild plants. It is a pretty species, with upright habit of growth about a foot high and linear, entire leaves. The corolla is gaping, fairly large, and of what may be described as a deep lavender shade of colour. The plant is fairly easily grown in dry sunny places, but is probably not a very long-lived perennial.

PLANTS TO WHICH AWARDS HAVE BEEN MADE, 1934.

Acacia decurrens. A.M. April 17, 1934. From Viscountess St. Cyres, Lymington. A very ornamental, fast-growing shrub for warm localities. The stems are smooth, and like the bi-pinnate foliage, of a pleasing grey-green colour. The little globular yellow flowerheads are abundantly produced in compound racemes.

Acacia diffusa. A.M. March 20, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A very attractive shrub for the cool greenhouse. The slender branches of the form exhibited are prostrate, bearing sickle-shaped, sharply-pointed, dark green phyllodes, in the axils of which arise stalked, globular heads of bright yellow flowers. The seeds of this prostrate form were collected in Tasmania by Mr. H. F. Comber under his number 1446.

Aristea capitata. A.M. April 17, 1934. From T. Hay, Esq., Hyde Park, London, W. An uncommon Cape Irid of perennial duration and requiring greenhouse treatment. The long, narrow leaves are erect and stiff. The small bright blue flowers are borne in long, cylindrical spikes.

Azara integrifolia. A.M. March 6, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A tender flowering shrub collected by Mr. H. F. Comber at an elevation of 1,200 feet in Llolli, Chile. The rich green, glossy leaves, of ovate shape, are very handsome. The flowers are small, but are rendered conspicuous by their clusters of deep yellow stamens.

Carnation 'Ditchling.' A.M. March 20, 1934. From Messrs. Allwood, Haywards Heath. A bright cerise perpetual-flowering variety of excellent form and having very full flowers with good calvces.

Chamaescilla corymbosa. A.M. April 17, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A small, tender plant suitable only for the alpine house, collected by Comber in Tasmania in 1930. The leaves are linear, bright green, 3 inches long at flowering time, the flowers gentian-blue, in short racemes.

*Cineraria 'Rainbow.' C. March 16, 1934. Raised and sent by Messrs. Carter's Tested Seeds, Raynes Park. Plants vigorous, 1½ foot tall, with large very dark green foliage; flower heads I-I1 foot across, 25-35 flowered, loose; flowers 5-7 inches diameter, single, somewhat floppy, of various shades of colour, blue predominating. Stock needs further selection.

Corydalis verticillaris. A.M. March 20, 1934. From Frank Barker, Esq., Stevenage. A dainty alpine plant collected in Persia

^{*} Award made after trial at Wisley.

in 1932 by Mr. E. K. Balls (No. 120), which received the Society's Preliminary Commendation when shown by the collector in 1933. It is a dwarf species, suitable for the rock garden or alpine house, with glaucous foliage and short racemes of creamy-white flowers tipped and spurred with rosy-purple.

Corylopsis platypetala laevis. A.M. April 17, 1934. From G. W. E. Loder, Esq., Ardingly. A deciduous Chinese shrub about 8 feet high with Hazel-like foliage. The light yellow, fragrant flowers are carried in many-flowered racemes, and appear before the leaves.

Cymbidium × Alexanderi 'Fantasy.' A.M. March 6, 1934. From Messrs. McBean, Cooksbridge. This is the result of fertilizing an almost pure white form of Alexanderi with its own pollen. The flowers are ivory-white with faint green shading.

Cymbidium × 'Apollo,' Exbury var. F.C.C. March 20, 1934. From Lionel de Rothschild, Esq. ('Curlew' × 'Miranda.') Large flowers, bright greenish yellow, the apex of the labellum marked with brownish red.

Cymbidium \times 'Cassandra' var. 'Betty.' F.C.C. March 6, 1934. From Messrs. H. G. Alexander, Tetbury. (*Alexanderi* \times 'Goosander.') An elegant variety in which the sepals and petals are pale pink, shaded with a deeper tint. The labellum is also pale pink, but heavily flushed with rose and rose-red.

Cymbidium \times 'Dingleden.' A.M. March 6, 1924. From Messrs. Stuart Low, Jarvis Brook. (Alexanderi \times Devonianum.) An interesting hybrid in which the influence of Devonianum is seen in the habit of the spike, which is drooping. The sepals and petals are reddish, while the labellum is buff with rose-pink shading and some red-brown spots.

Cymbidium × 'Jason' majesticum. A.M. March 6, 1934. From Messrs. H. G. Alexander. (Alexanderi × 'Miranda.') One of the largest of Cymbidium flowers. Delicate green, the labellum marked with red-brown spots at the apex.

Cymbidium × 'Minivet,' Exbury var. A.M. March 20, 1934. From Lionel de Rothschild, Esq. (eburneo-Lowianum × 'Castor.') Large flowers, light creamy yellow, apex of labellum heavily marked with red-brown.

Cymbidium × 'Phryne' var. 'Flamingo.' A.M. April 17, 1934. From Messrs. H. G. Alexander. ('Flamingo' × 'Vesta.') The large and showy flowers are white faintly tinged with pink, while the labellum is much marked with red blotching.

Cymbidium × 'Profusion.' A.M. March 6, 1934. From Messrs. McBean. ('Ceres' × 'Vesta.') A pleasing variety in which the large flowers are greenish-buff colour, with occasional pink shading. The labellum is heavily marked with rich red-brown.

Cymbidium × 'Profusion' var. 'Ruby.' A.M. March 20, 1934. From Messrs. McBean. ('Ceres' × 'Vesta.') Sepals and petals rich red, with lines of a deeper tint, labellum whitish with pink shading and red markings.

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Cymbidium × 'Thora' var. 'Rose Princess.' A.M. March 20, 1934. From Messrs. H. G. Alexander. ('Flamingo' x 'Goosander.') Flowers of medium size, bright pink, shaded and veined with rosepink, while the labellum has a white centre and a rose-pink margin.

Dendrobium × 'Constance Wrigley.' A.M. March 6, 1934. From Miss Wrigley, Bridge Hall, Bury. ('Lady Colman' × plumptonense.) An attractive plant with large flowers. The sepals and petals are rosepurple, while the round labellum is whitish with a dark maroon centre and a purplish apex.

Forsythia suspensa atrocaulis. A.M. April 17, 1934. Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A variety of the variable F. suspensa, with dark stems and very large, broad-petalled, bright yellow flowers. This valuable, late-flowering variety was discovered by Wilson in Hupeh in 1907.

Hippeastrum 'Susan.' A.M. March 20, 1934. From Mrs. R. Rushbrooke, Hatfield. A large, handsome, crimson variety having down the middle of each segment a broad greenish-white streak feathering out widely at the base.

Moraea villosa. A.M. April 17, 1934. From Lady Lawrence, Burford, Dorking. An elegant South African Irid. The widelyexpanded flowers are produced singly on slender stalks a foot high. They are lilac with blue-black basal blotches and a pale yellow beard. Unlike the flowers of allied species, these are said to remain open for several days.

Odontioda × 'Conchita.' A.M. April 4, 1934. From Messrs. Charlesworth. (Odontioda \times 'Alcazar' \times Odontoglossum \times Ossulstonii.) Well-formed flowers of medium size, sepals and petals reddish purple, labellum purplish with a rosy mauve apex.

Odontioda \times 'Seba' var. rubra. A.M. March 20, 1934. Messrs. Charlesworth, Haywards Heath. (Odontioda × 'Hilda' × Odontioda × 'Sir Douglas Haig.') Flowers deep solid crimson, except for some rose at the tip of each sepal and the margin of the labellum.

Odontoglossum × 'Purple Queen,' 'Eileen.' A.M. April 17, 1934. From Messrs. Charlesworth. ('Dusky Monarch' × percultum.) large flowers are deep purple, with a metallic sheen, while the labellum has a broad white margin.

Pomaderris elliptica. A.M. March 6, 1934. From E. M. Preston, Esq., Hayes, Kent. This evergreen shrub is a native of New Zealand and is suitable for cultivation in the cool greenhouse, where it flowers profusely over a long period. The leaves are elliptical-lanceolate, dull green above and grey-pubescent beneath. The small, yellow flowers are borne on pinkish stalks in dense axillary and terminal panicles.

Primula Winteri alba. A.M. April 4, 1934. From Lord Aberconway, Bodnant. This variety received the Preliminary Commendation on March 10, 1931, when shown by Messrs. C. Elliott, Ltd., of Stevenage. The flowers are of good form and substance, milk-white with a dull yellow tube.

Prunus Mume grandiflora. A.M. April 4, 1934. From Collingwood Ingram, Esq., Benenden. A superior double-flowered variety of the Japanese Apricot. It forms a sturdy tree with numerous large and widely expanded flowers. The buds are deep pink in colour, the open flowers somewhat paler with prettily undulated petals.

Rhododendron × 'Avalanche.' A.M. April 17, 1934. From Lionel de Rothschild, Esq., Exbury, Hants. A magnificent hybrid between $R. \times Loderi$ and R. calophytum. The leaves are large with blades elliptic-oblong sharply set off from the petiole, the base being rounded to widely cuneate; dark green above, paler below. Inflorescence a fine large truss of 12 to 14 flowers borne on long pedicels which, like the bracts, are rosy red and finely puberulous. Corolla large, pure white with a small magenta-rose blotch and 3 lines of colour inside at the very base. Style and ovary finely puberulous.

Rhododendron (Azalea) 'Balzae.' A.M. May 29, 1934. From Lionel de Rothschild, Esq., Exbury. Flowers 10-12 in compact trusses with corollas of a deep orange colour, the tube deeper and redder and the upper lobe yellowish, about 3 inches across at the mouth, the lobes frilled at the margins. Filaments the same colour as the corolla, style red.

Rhododendron (Azalea) 'Basilisk.' A.M. May 29, 1934. From Lionel de Rothschild, Esq. Flowers 12–14 in a compact truss, wide open, about 4 inches across, deep yellow when first open, the lobes fading to whitish later, faintly flushed with salmon pink on the back and at the margins of the lobes, the upper lobe with a deep orange blotch, lobes frilled at the margins.

Rhododendron (Azalea) 'Berryrose.' A.M. May 29, 1934. From Lionel de Rothschild, Esq. Flowers about 10 in a compact truss, the corolla wide open, nearly 4 inches across, deep salmon at first, later paler and pinkish-salmon, the tube deep red especially above and the upper lobe yellowish.

Rhododendron (Azalea) 'Hotspur.' A.M. May 29, 1934. From Lionel de Rothschild, Esq. Similar to Azalea 'Balzac' but rather lighter in colour, the corolla being deep orange-red with the upper lobe yellowish; filaments and style yellowish.

Rhododendron chrysodoron. A.M. February 20, 1934. From Lord Aberconway, Bodnant. A hardy member of the Boothii series with elliptic leaves, bright shining green above, glaucous and loosely lepidote below. Inflorescence of about five unspotted deep clear yellow flowers. Calyx small, fringed with white hairs. Raised from seed collected in China by George Forrest.

Rhododendron crebreflorum. A.M. May 1, 1934. From L. de Rothschild, Esq. A dwarf species only a few inches in height with yellow-tinged white flowers in clusters of about ten. The corollas are about $\frac{1}{2}$ inch in length. Collected on the Chungtien Plateau, Yunnan.

Rhododendron Elliottii. A.M. May 29, 1934. From J. J. Crosfield, Esq., Embley Park, Romsey, Hampshire. A member of the series

Irroratum subseries Parishii shown under the number K. W. 7725. An erect plant with branches open, stout and ascending. Leaves oblong, 6 to 10 inches long and 2 to nearly 4 inches wide, bright green above, paler below. Inflorescence a tight and compact, flat-topped truss of about 12 flowers borne on short stout glandular pedicels. Corolla fleshy, deep blood-red, faintly spotted all over within, funnel-shaped, about 2 inches long and across at the mouth, deeply pouched at the base and darker there; style glandular-hairy to the tip, longer than the stamens.

Rhododendron \times 'Firetail.' A.M. May 29, 1934. From J. J. Crossfield, Esq. A charming hybrid between $R. \times$ 'Britannica' and R. eriogynum. The leaves are oblong, rounded at the base, up to 9 inches long and 2 inches wide, with petioles about $1\frac{1}{4}$ inch long. Inflorescence a compact but not crowded truss of about 14 evenly disposed flowers borne on glandular pedicels which are about $1\frac{1}{4}$ inch long. Corolla a deep glowing crimson faintly spotted in the upper segments, up to 3 inches across at the mouth. Calyx reddish and glandular; filaments and style the same colour as the corolla, the style much exceeding the stamens in length.

Rhododendron × impeanum. F.C.C. May 8, 1934. From The Director, Royal Botanic Gardens, Kew. A magnificent dwarf hybrid between R. impeditum and R. Hanceanum which flowers profusely when quite small and is quite hardy and very easy to grow. A low, spreading, much and intricately branched shrub, up to about 2 feet high, with elliptic and ovate-oblong leaves which are up to \(\frac{3}{4}\) inch long; dark green above, glaucous and lepidote below. Flowers borne in crowded inflorescences at the ends of the branches and produced so profusely as to cover the plant completely. Pedicels very short; calyx distinctly 5-lobed, ciliate and densely lepidote; corollas about I\(\frac{1}{4}\) inch across of a beautiful deep lilac in colour; stamens exserted; filaments of the same colour as the corolla and long white hairy at the base; ovary glaucous and densely lepidote, style glabrous, pink and overtopping the stamens.

Rhododendron imperator. A.M. May 1, 1934. From Lord Swaythling, Townhill Park, Southampton. A Burmese species collected by Capt. F. K. Ward, forming a mat with small pointed narrow leaves $\frac{3}{4}$ to 1 inch long. Flowers rosy purple, very freely borne, about $\frac{1}{2}$ inch across. The plants have made growths up to 15 inches across and only 2 inches in height.

Rhododendron Johnstoneanum. A.M. May 8, 1934. From Col. H. Spender Clay, M.P., Ford Manor, Lingfield, Surrey, and Lt.-Col. L. C. R. Messel, O.B.E., Nymans, Handcross, Sussex. A hardy shrub raised from K.W. 7732. Leaves aggregated towards the ends of the branches, elliptic, up to about 3 inches long and 1½ inch wide, dark green above, glaucous to brownish olive-green and densely lepidote below, densely fringed with hairs along the margin. Flowers borne in threes at the ends of the branches; pedicels up to ¾ inch long, densely scaly; calyx obsolete; corolla open funnel-shaped, about

3 inches across, pale creamy-white with a yellow blotch at the base of the tube (upper side) within, densely lepidote outside, the scales most numerous in bands running down from the lobes; stamens included; style green and long exserted.

Rhododendron \times 'Mary Swaythling.' A.M. May 1, 1934. From Lord Swaythling. R. Fortunei \times R. campylocarpum. A hardy hybrid, bushy in habit and with foliage similar to that of R. Fortunei. Flowers soft yellow without spots or blotches and of about the same size as in R. Fortunei.

Rhododendron \times 'Sarita Loder.' A.M. April 17, 1934. From Lt.-Col. G. H. Loder, M.C., High Beeches, Handcross, Sussex. A beautiful hybrid between R. Griersonianum and R. \times Loderi. The leaves are like those of R. Griersonianum, narrow elliptic to linear-oblong from a rounded base, apex acute; bright green above, paler below. Inflorescence a loose truss of 9 to 11 flowers borne on long pedicels which are dark brownish red and sparsely white-glandular. Corolla deep crimson in the bud, when first open a beautiful deep rose colour, somewhat darker in the short tube, the wider-spreading limb paler, especially inside and paling to a lighter rose colour as the flower ages, minutely pubescent outside. Calyx small, dark brownish and glandular; filaments and style red and glandular.

Rhododendron Stewartianum. A.M. March 20, 1934. From L. de Rothschild, Esq., Exbury. A member of the series *Thomsonii*, subseries *Thomsonii*, with broadly elliptic leaves which are dark green above and vary from glaucous to completely covered with a thin veil of indumentum below. The flowers exhibit a most striking range of variations in colour and degree of marking of the inside of the corolla. The colours range from almost white or pale cream to deep yellow, self coloured or flushed with rose, through buffs and shades of red to a deep bright magenta. In addition, the corollas exhibit all stages from unmarked to quite heavily flecked with a deeper colour. The style is glabrous and the overy is more or less glandular, rarely quite glabrous.

Rhododendron \times Sussex Bonfire. A.M. May 1, 1934. From Lady Loder, Leonardslee, Sussex. (R. haematodes \times R. \times 'Cornish Cross.') A dwarf plant with oval leaves 2 to 3 inches long, $1\frac{1}{4}$ inch wide. Flowers deep blood red in trusses of six to eight. Hardy.

THE AWARD OF GARDEN MERIT.-XXV.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

178. Cytisus × praecox.

Award of Garden Merit, July 17, 1933.

The species of Cytisus and Genista bear so great a general resemblance to one another that the names have often been used almost interchangeably in gardens, and for this there is the further excuse that the line of demarcation between these genera has been shifted from time to time by botanists of repute, so that nearly all the plants now known as Genista have at some time been called Cytisus, and nearly all the plants now put in the genus Cytisus have at some time or other been called Genista.

Linnaeus established both genera. He included in Genista, for instance, G. tinctoria, G. pilosa and G. sagittalis, and in Cytisus, C. monspessulanus, C. hirsutus and C. supinus among others, but he called our present-day C. purgans, Spartium purgans, thus linking it up with S. junceum. His S. scoparium, our common broom, is now often known as Sarothamnus scoparius, and in Cytisus he placed the common Laburnum, now usually put into a separate genus Laburnum as Laburnum vulgare.

Subsequent botanists have shifted the limits of the genera again and again, and it is little wonder that nursery catalogues and garden labels have not kept abreast of modern practice.

It is not easy, without reference to allied genera, to point out the differences now usually depended upon to separate the genera Cytisus and Genista from one another, and in the hope that it may help to do so we give a translation of the key to the section of Leguminosae to which they belong from Ascherson and Graebner's Synopsis der Mitteleuropäischen Flora. It will be seen that the whole section is extremely rich in plants of decorative value, and were it not that some are rather tender there is scarcely a species in the section that would not be welcome for its beauty in a garden large enough to contain them all.

- A. Seeds without a swelling at the hilum.
 - I. Calyx teeth or lobes much longer than the calyx tube.
 - a. Wings of the flower joined at the apex. Keel beaked.
 Herbaceous, rarely shrubby plants with usually digitate leaves of more than three leaflets. Stipules adnate to the petiole.

^{*} The notes on the first hundred plants to receive the Award of Garden Merit have been collected from our Journal, vols. 47 to 53, and published as a pamphlet, price is. For subsequent notes see vol. 54, pp. 218 and 423; 55, pp. 121 and 276; 56, pp. 80 and 245; 57, pp. 65 and 354; 58, pp. 171 and 400; and 59, pp. 131 and 308.

- b. Wings separate. Keel obtuse. Leaves with three leaflets. Stipules mostly free. Argyrolobium.
- II. Calyx teeth short, rarely a little longer than the calyx tube.
 - a. Claw of the lower petals adnate to the staminal tube.
 - I. Calyx not becoming bladder-like after flowering. Flowers yellow or white.
 - a. Calyx tube sheath-like after flowering, with five short teeth.

 Spartium.
 - b. Calyx tube campanulate or tubular.
 - Leaves absent, or with only one, rarely with three leaflets. Calyx tube campanulate. Upper calyx teeth joined or free. Genista.
 - Leaves always with three leaflets. Calyx tubular. Upper calyx teeth free, broad, sickle-shaped. Petteria.
 - 2. Calyx becoming bladder-like after flowering. Flowers bluish or violet. Erinacea.
 - b. Claws of lower petals free. Flowers yellow.
 - I. Fruit glandless, the winged sutures thickened.
 - a. Calyx very short, 2-lipped. Fruit more or less stalked. Thornless trees or shrubs. Laburnum.
 - b. Calyx shortly tubular, almost truncate. Fruit sessile. Thorny shrubs.
 Calycotome.
 - Fruit densely glandular-hairy, margins neither thickened nor winged. Thornless shrubs. Adenocarpus.
- B. Seeds with a swelling on the hilum.
 - I. Leaves small, scale-like, or when distinctly developed, the lower three calyx teeth form a lower lip.
 - a. Calyx deeply 2-cleft, leathery, coloured. Fruit little longer than the calyx.
 Ulex.
 - b. Calyx shortly 2-lipped, green. Fruit wide, exceeding the calyx.
 - stigma capitate. Style very long, much curved in upper part.
 Sarothamnus.
 - 2. Stigma oblique. Cytisus.
 - II. Leaves always distinct. Calyx teeth almost equal. S. African shrub. Keel shorter than the standard.

Hypocalyptus.

Thus Cytisus and Genista are separated by several small characters which need to be looked for before they become evident, and the fact that in Nature they occupy and often colonize considerable areas of somewhat similar soil, usually rather barren, often sandy or rocky places, has resulted in a likeness of form which makes their separation the more difficult.

Notes on three or four shrubs of this group have already been given in this series, all of them of rather late-flowering habit; the one now referred to flowers earlier, usually in early May. It forms a rounded

bush up to about four or five feet in height, producing a remarkable abundance of young green, silky, slender, often somewhat curved shoots every year from which the leaves—usually of but a single leaflet about inch long—soon fall. In May every shoot produces abundant clear sulphur-yellow flowers which last in beauty for some time and render the shrub one of the most striking objects in the garden. Its value is only marred by the heavy and unpleasant scent which the flowers produce.

It is easily accommodated so far as soil is concerned, but is best in a well-drained sandy loam. It puts up with wind and needs the sun, and in spite of its scent is well worth a place in the garden of choice shrubs. Cuttings of firm shoots taken in August and put in sand under a bell-glass to remain until spring give the best way to propagate it, for it is a hybrid found in Messrs. Wheeler's nursery at Warminster as a stray seedling, and its seedlings vary, giving rise to forms approaching their grandparents, the Spanish C. albus and C. purgans.

 $C. \times praecox$ is intermediate between its parents in habit, colour and time of flowering, and on the whole hardier than C. albus, and the seedling form from it called $C. \times praecox$ superalbus $(C. \times praecox albus)$ of catalogues) approaches very near to C. albus. If the plant is not found catalogued under the name $C. \times praecox$, as it should be, it may be looked for under Genista.

181. GENISTA PILOSA NANA. Award of Garden Merit, June 10, 1929.

Genista pilosa is a plant of wide distribution, found wild in Southern Sweden, Denmark, Great Britain from Suffolk and S. Wales southwards, France, Spain and Portugal, Italy, the Balkan Peninsula and occasionally in Western Russia. It grows on sandy heaths and in dry woods, especially pine woods, and on sunny sandy hills, and is found in Bosnia as high up as over 5,000 feet. In our own country it is rare, but in its continental habitats it often covers large tracts of country, and is of course perfectly hardy anywhere in our land.

Like most plants of wide distribution it is variable in habit, and the Award is made to the dwarfest form, which is found on the sandy heaths in the neighbourhood of the North Sea coast in England and France. This grows only an inch or two high, sending its creeping stems spreading in all directions, and therefore very suitable for the rock garden, where it will follow the contours of the rocks, and for covering sunny dry banks.

The simple leaves are small and narrow and the margins roll upwards, showing the silvery lower sides of the leaves the summer through, and dropping to show the network of the densely tangled slender shoots, brown, furrowed and striped with green, for the winter. In spring or early summer the branches produce from every leaf axil one or two stalked rather small flowers, which so cover the plant that it looks a mat of bright golden yellow, and often again in autumn one may find it flowering.

The seeds are produced with some freedom, and may be used to propagate the plant, though at times a little variation in habit may be found among the seedlings.

The plant occurs in catalogues at times under the name G. pilosa humilis, and may even be found as Cytisus pilosus.

182. Rhododendron Yunnanense.

Award of Garden Merit, July 23, 1934.

Although it is the intention to mark the plants to which the very high Award of Garden Merit is given as the most suitable of their kinds for the gardens of England, and indeed, within limits, to indicate by the Award plants which no garden should be without, it would be idle to suppose that every garden can grow (so long as it is large enough) all of them, for a few require special conditions of soil or moisture. This is one of them. It will not thrive where lime is present, and it is doubtful whether the preparation of special beds, unless they be raised above the limy soil and supplied with lime-free water, is worth the trouble, for sooner or later the lime finds its way in and the plants suffer. Given, however, a lime-free soil containing sufficient sand to keep it always open and sufficient decaying leaves or peat to keep it always moist; given, too, some overhead shelter from the too ardent rays of the summer sun and something to check drying winds, one may attempt with every hope of success to make a home for some of that vast army of Rhododendrons which has been peacefully penetrating into nearly every part of our land since the floral riches of Western China have been opened up to us.

One of the conditions upon which an Award of Merit is bestowed is that the plant shall be sufficiently common to be available to most at a reasonable price. Another point is that, given the general conditions required, the plant shall not be very difficult to grow. All points required are well met by this species, which has been sufficiently long in England to prove its value, for the Abbé Delavay sent seed of it to Paris in 1889 and it soon found its way to England.

It is a plant of somewhat sparse habit with slightly scaly young branches, short-stalked narrow oblong leaves about 2 to 3 inches long, rather bristly both on surface and margin when young and with some scales on both sides, and grows eventually to about 8 or 9 feet high. The foliage may be entirely lost in hard winters. The beauty of the plant lies in the clusters of pale blush flowers spotted with brownish crimson on the upper petals and produced at the tips of the branches in clusters of four or five flowers at the latter end of May.

As with many other Rhododendrons, and particularly with R. Augustinii, which has also had the Award of Garden Merit, it is well to see this flower in the nursery before it is planted, for there is a considerable amount of variation in the delicacy of the colouring, which in the best forms is very beautiful. It has been pictured in the Botanical Magazine, t. 7614.

GARDEN NOTES.

Apricots.—A correspondent (Mr. H. T. BARNETT of Tilehurst, Berks), who has had some experience of Apricots in Kent, Sussex, Berkshire and Herefordshire, extending over half a century, writes that, in most soils, to plant an Apricot tree against a low wall under 12 feet and in cultivated ground is merely courting disaster. Success can, however, be assured by using the wall of a house, by preference southeast or south, and making a garden path with flagstones or gravel over the roots of the tree. The extensions of an Apricot tree should be nailed to the wall and pruned or shortened as little as possible. Winter pruning should be avoided and the tree kept in shape by disbudding, pinching back, and summer pruning. The wall of a house is so much warmer than an ordinary wall that it is more likely to carry the tree safely over the blooming period. In planting it is difficult to make the hole too big or too deep so long as it is filled up with at least 50 per cent. mortar rubble (the older the better) before the tree is put in position. Of varieties, it is wise to try 'Veitch's Large Red.' This has not the flavour of 'Moor Park' (on its sunny side) or of 'Alsace,' but in the writer's experience is more hardy and a much more regular cropper.

Occasionally Apricots succeed as standards—notably the tree at the vicarage of Swanley village, Kent, which yielded one year seven bushels. It is of the 'Breda' type. Probably by careful selection a hardy race could be evolved.

Primulas and Meconopsis in Aberdeen.—Early in June I visited a garden in Aberdeenshire where Primulas are a great feature, and possibly a short account of it may be of interest.

I have never seen Primulas growing so well or so happily. seem to thrive in the cool, damp soil, and the Japonicas and Pulverulentas grow like cabbages. The flowers certainly appear larger than any I can grow in the south of England, and deeper in colour.

The garden was begun seven years ago on a partially shaded bank sloping down to a pond. The colt's-foot—which covered the whole place—was dug out, and the pond mud and some leaf soil added. I suppose there is now about half an acre of Primulas, at this moment (June 10) in full flower, with drifts of blue poppies (Meconopsis betonicifolia) which sow themselves year after year and grow to something like 4 feet high.

There are some Rhododendrons and quite a number of Lilies—Lilium pardalinum, L. philippinense, L. giganteum, L. Martagon, L. umbellatum and others. But far the best and most wonderful of the flowers, to my thinking, is the brilliant deep-blue Meconopsis grandis. I have never seen it so good. It stands out by itself, three or four good strong

plants in a clump. Will it set seed? That is the question. It has been pollinated with M. simplicifolia, also doing splendidly. Side by side are M. regia and M. superba and a large patch of the lovely pale yellow M. integrifolia, and M. Wallichii almost the size of a gooseberry bush.

The plants of M. grandis are about three years from seed, but have never flowered before. All came through last year's dry season, but of course it was not so dry up there as in England.

The smaller and more delicate Primulas also flourish. The lovely *Primula nutans* is doing well, and *P. Littoniana* comes up year after year, but begins its growth so late that each spring one thinks it is dead. *P. Beesiana* and *P. Florindae* continue to keep the garden gay till well

into July.

I am adding a list of the many varieties that grow in this Aberdeenshire garden, as it may interest some readers.

Primulas. japonica - Beesiana Bulleyana pulverulenta secundiflora sikkimensis Winteri Poissonii microdonta alpicola and microdonta violacea denticulata Cockburniana chungensis chionantha capitata nutans Littoniana farinosa helodoxa involucrata conica (and many others) Meconopsis.
betonicifolia
simplicifolia
integrifolia
paniculata
violacea
grandis
regia
superba
Dwogii
Wallichii
Prattii
latifolia

H. M. Smith.

Magnolia parviflora.—This species is one of the most useful for all gardens. In some districts it has attained 25 feet in height and width, but is more common as a well-branched shrub. It is quite hardy in Sussex. I have never seen the plant injured by frost, and the flowers but rarely. The oblong-obovate leaves vary from 3–5 inches in length, or even 6 inches on young seedlings. The pointed, creamy flower-buds are set somewhat horizontally on stalks of $1\frac{1}{2}-2\frac{1}{2}$ inches long. The pure white flowers are at first globular, the incurved, concave petals flattening as they open, showing a rosy-crimson disk

of stamens around a large green pistil in the centre. A succession of flowers is borne from May until August. In October and November the red, drooping seed vessels are a conspicuous ornament. Frosty weather causes them to fall. If needed for propagation they should be kept in moist sand until the seeds drop or rot out. Then sow at once in well-drained pots and place in a cool house or cold frame. Fully developed, undried seed, sown in winter, will germinate freely in a temperature of 45° F. during the following February or March. Dried seed may require 2 or 3 years. When the first true leaf appears, pot off singly or transplant into deep boxes with good drainage; keep close for a time until established. Plant out in nursery beds the next spring; leaf mould and sand mixed with the loam assist root formation. It is a good plan to cover beds of young plants with a light framework on which protection can be placed during severe frost.

Among the many plants raised from home-saved seeds at Nymans very few inferior forms have appeared. The best bear flowers measuring 5 inches in diameter. *Magnolia parviflora* is a native of Japan and Corea, and is supposed to be one of the parents of the beautiful hybrid *M. Watsonii.—J. Comber*.

Hardy Annuals for Autumn Sowing.—Although the normal and customary time for sowing Annuals is in the spring, many know that some of the hardier species give better results when sown out of doors in the autumn, say during September or October, the precise date depending of course upon weather conditions. This has been tested and found to be the case by many growers, both those who sow for market purposes and also in private gardens.

The same care should be exercised as when making sowings in the spring—that is, the seed should not be sown so thickly that the seedlings become drawn up and weakly through overcrowding. Care should also be taken to avoid growing in damp or heavy soil. The process of thinning out should commence as soon as the seedlings are large enough to handle and take place gradually as they develop, but the final thinning may be left until the spring, when the winter will have spent its effect upon the plantation and the amount of thinning necessary can be better judged.

Some of the leading Hardy Annuals which can be recommended for treating in this way are the various kinds of Cornflower, Calendula or Garden Marigold, Larkspur (Stock-flowered and Hyacinth-flowered varieties), Nigella 'Miss Jekyll,' Clarkia elegans (double), Eschscholzias of different types, Godetia Schaminii and other tall varieties, Tall Double Scabious, and Poppies, including the beautiful Shirley Poppy.—J. M. Bridgeford.

Campanula Elatines.—This species, which was shown before the Floral Committee B on June 13, received a well-deserved Award, but the specimen exhibited did not show the true character of the Cottian plant. It was a neatly grown clump, apparently "pinched" for

appearance sake and therefore shorn of its beauty. In Nature as well as in gardens *Campanula Elatines* sends out long and brittle branches which closely adhere to the rock sheltering the fat root-stock. Indeed, I would like to compare it with Ivy, although the branches lie adpressed, but do not cling.

The Campanula is admirably fitted to cover bare rock, growing vertically in case of need, but the root should be planted on the north side. It is easily raised from seed, freely set in this country, and can also be struck from root cuttings.—P. Rosenheim.

Cirrhaca dependens.—Only occasionally do species of this little-known genus appear in cultivation, but interest is always aroused by the construction of the flowers, among the most curious in Orchidaceae.

The plants are characterized by small, clustered, ovate monophyllous pseudobulbs, furrowed as in Stanhopea, producing pendent inflorescences from the base of the latest made.

In Cirrhaea dependens twelve to twenty flowers are carried on each spike, the pedicels so curved that the flowers appear clustered. Variation in colour is considerable, but, in general, each flower if extended would be 2 inches across, with narrow sepals and petals, the former with more or less revolute margins, the petals smaller, all greenish, marked, barred and spotted with red-brown. The three sepals are strongly reflexed, the petals patent.

The labellum, though following the orchidic rules of structure, at first sight appears complex: the base is a slender, curved column, the blade a narrow projection, while the side lobes point exactly opposite and appear as one, their inner edges being parallel. The whole organ has the appearance of an inverted beetle with the elytra underneath.

The pollinia are so placed that, as in Notylia, they recline on the back of the curved column, forming a perceptible lump and so causing the stigma to terminate that organ.

The nearest ally seems to be C. Loddigesii, distinguished by the divergent side lobes to the lip.

Both are natives of Brazil and require cultivation similar to that given to Gongoras; and as occasional waterings only are required in winter, the plants should be accommodated in small pans which can be suspended near the glass. The minimum winter temperature should not be less than 60° F.—E. Cooper.

BOOK REVIEWS

"The Genus Meconopsis." By George Taylor. 8vo. 130 pp. (New Flora and Silva, 1934). 20s.

Mr. George Taylor's work "The Genus Meconopsis" is most welcome both to the botanist and to the gardener, and he is much to be congratulated on it.

Knowledge is the foundation on which all good books are built, and obviously the author has acquired all possible knowledge of his subject. With a genus of which comparatively few species are in anything like general cultivation, knowledge must be based largely on study of the dried specimen and of the written word. The specimens of the genus in the various Herbaria have undoubtedly been subjected to a very careful and critical examination and collation, and the fact that the author has assembled and arranged so complete a list of references to Meconopsis, not only from botanical but also from horticultural literature, proves his mastery of the writings on the subject, and as well places under a debt of gratitude to him those of us who would pursue the study of Meconopsis even further than the present volume carries us.

In an age of haste when a very casual acquaintance with a subject is too often thought a sufficent basis for a book upon it, a volume founded on real

research is refreshing and will be appreciated.

At the same time, the study and observation of living plants, where they are available, has not been neglected by the author. All available information, for instance, as to the various garden hybrids has been collected and set forth—even such hybrids as have proved ephemeral. At the end of the volume Mr. Cox has contributed a most useful chapter on the cultivation and garden merit of the various species—though in this connexion it must be remembered that notes based, to some extent at any rate, on cultivation in the North East of Great

Britain are not always fully applicable in the South.

Meconopsis is a genus that for the most part is of recent discovery and introduction, and much fresh material is at hand since Sir David Prain dealt so ably with it in 1915. Isolated herbarium specimens that showed differences quite sufficient to distinguish the plants as different species, have been supplemented in many cases since that date by so many intermediate forms that the distinction can now hardly be maintained. It is no reflection therefore on Sir David Prain's work that Mr. Taylor merges some of the earlier species in every instance be it said after giving full chapter and verse for his conclusions. Such mergers of course upset the accepted nomenclature—Meconopsis Wallichii for instance is no more; and if gardeners have to suffer this inconvenience, they have at any rate the consolation of knowing that they suffer it on scientific grounds and not, as is so often the case, as a result of research into old and long forgotten priorities of nomenclature which might be well left in oblivion. If on botanical grounds M. Wallichii and M. napaulensis cannot be distinguished as separate species, then gardeners must bow to the inevitable with a good grace and say good-bye to an old friend without undue regret.

The merging of *M. Wallichii* and *M. napaulensis* is the chief change which is proposed in nomenclature—but a second of importance is involved in the grouping, within the species *M. horridula*, of a number of slightly variant individuals known hitherto by other names. This is a proposal that should be welcomed by the gardener, as the names of the species absorbed were much confused and the plants were very similar. In reading the arguments for this name and for that, one is impressed by the fact that the author's botany is very sound, and that change is not made for the sake of change, but on convincing evidence from carefully studied

facts.

The book however is not merely botanical, it is a mine of information on the genus. The history of the discovery and of the introduction of every species is given in detail and makes most interesting reading. Twelve sketch maps show the distribution of the species—maps that might perhaps have been improved if the great rivers of China had been inserted as landmarks. There is a host of illustrations from most admirable photographs—most of them I suspect taken at Edinburgh—which enables one to judge very clearly the character of the plants from a garden point of view.

In short the volume is a model of what a monograph should be. No botanist's

shelf can be, and no gardener's shelf should be, without it.

Many other genera of great garden interest remain without a monograph we may hope that Mr. Taylor may see fit in the future to turn his attention to "The Profession of Forestry." By A. D. Read. 8vo. xi + 68 pp. (Macmillan, New York, 1934.) 5s. net.

This little book is intended as a guide for young men seeking to know what is required of those entering the profession of Forestry, and what remuneration may be hoped for. It deals entirely with American conditions and is well illustrated.

"Colour in the Garden." By M. E. Stebbing. 4to. viii + 111 pp. (Nelson, London, 1934.) 12s. 6d. net.

This is an annotated list of herbaceous plants (including bulbs) and shrubs arranged alphabetically under the colours of their flowers and illustrated by coloured figures of many of the plants. In addition to the plates in colour there are a few excellent drawings in black and white.

"The Herbaceous Garden." By Lady Martineau. Ed. 4. 8vo. 309 pp. (Williams & Norgate, London, 1934.) 10s. 6d. net.

This new edition of a book which first appeared in 1913 will no doubt be welcomed by many since so large a number of plants have come into cultivation during the past twenty years. One chapter on expense has disappeared and its place is taken by one on Lilies, Nomocharis, Gentians and Meconopsis. We are rather surprised to learn that Nomocharis has simple requirements. It may be so, but no one who has tried to grow them in southern England would venture to predicate those requirements.

"The Care and Repair of Ornamental Trees." By A. D. C. Le Sueur. 8vo. xiv + 257 pp. (Country Life, London, 1934.) 10s. 6d.

This is a book much needed and well prepared on a subject of perennial interest to nearly all English people who care for the amenities of their country-

side and for the fine old trees that still exist in so many gardens.

The book opens with a chapter on the structure of trees, then follow directions for pruning and lopping with particulars of the tools necessary, consideration of the treatment of wounds and of backward trees, and chapters on troubles due to insect pests and fungi. The preservation of old trees naturally comes in for a great amount of consideration and clear directions are given of work necessary. The author deprecates the use of concrete for filling superficial wounds and advises the use of bitumens of various types according to circumstances.

A useful chapter on trees and the law, and others on the planting and care

of street trees deal with matters of perennial interest.

We can cordially commend this book to all who take an interest in our country's trees, whether they be those of the past, the present, or the future.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Cotyledon rotundifolia Haworth. By R. A. Dyer (Bot. Mag., t. 9368; July 1934).—Allied to C. hemisphaerica, with which it has to some extent been confused. A succulent species from Cape Province with nearly erect flowers with a green tube and rosy petals in a spike-like inflorescence. The upper leaves are roundish in outline.—F. J. C.

Cypripedium cordigerum D. Don. By V. S. Summerhayes (Bot. Mag., t. 9364; July 1934).—Native of Himalaya, perhaps into Yunnan. A terrestrial species, probably hardy in a shady place, somewhat like C. Calceolus, but with the petals and sepals flattish and green, the lip white.—F. J. C.

Deutzia rubens Rehder. By H. K. Airy Shaw (Bot. Mag., t. 9362; July 1934).—D. hypoglauca is regarded as not specifically distinct from this rather widely distributed Chinese species. It is a hardy shrub flowering in early June, with rather narrow serrulate leaves usually glaucous below, and white flowers often purple tinged outside in 10–30-fld. cymes.—F. J. C.

Ephedra viridis Coville. By J. Hutchinson (Bot. Mag., t. 9366; July 1934). —Utah, California, Texas and Colorado. Bright green and fastigiate in growth and thus distinguishable in the field. Dioecious. Flowers yellow, fruiting bracts ivory-white.—F. J. C.

Iris cretensis Janka. By W. B. Turrill (Bot. Mag., t. 9369; July 1934).—Often called I. unguicularis angustifolia and I. stylosa angustifolia and differing from I. unguicularis mainly by its very narrow leaves, and smaller flowers. This Cretan plant is perhaps the extreme form of I. unguicularis in the direction of narrow leaves.—F. J. C.

Lonicera hispida bracteata Pall. By H. K. A. Shaw (Bot. Mag., t. 9360; July 1934).—Discovered long since in the Himalaya and figured from a plant grown from seed collected by Ward at 10,000 feet in S.E. Tibet. An erect shrub with hairy stems and yellow flowers in pairs almost hidden in the pair of large bracts beneath them.—F. J. C.

Pedicularis Delavayi Franch. By J. S. L. Gilmour (Bot. Mag., t. 9367; July 1934).—A native of the Lichiang Bange in Yunnan at 12,000 feet in the open stony pastures. A striking plant with bright purple flowers, difficult to cultivate and more difficult to keep in cultivation.—F. J. C.

Rhododendron detonsum Balf. f. et Forrest. By J. Hutchinson (Bot. Mag., t. 9359; July 1934).—Native of Yunnan, introduced by G. Forrest in 1917 from margins of maple forests at 10,000 feet. A fine species of about 10 feet in height with large leaves at first covered with brownish hair below, and large pink flowers with a few carmine spots in the back of the tube, arranged in a loose truss of up to eleven. May flowering.—F. J. C.

Tulipa cypria Stapf. By W. B. Turrill (Bot. Mag., t. 9363; July 1934).— This plant has hitherto been included with T. montana, than which it has a more robust stem and larger flowers, which are dark wine-red with a yellow bordered black blotch within. Possibly native of Cyprus.—F. J. C.

Vallea stipularis pyrifolia. By F. Ballard (Bot. Mag., t. 9365; July 1934).—A greenhouse plant introduced by Mrs. Tracey from the Andes of Colombia, where it grows to a small bushy tree. Flowers abundant, cup-shaped, deep rose in May and June.—F. J. C.

Verbena corymbosa Ruiz et Pavon. By E. Milne Redhead (Bot. Mag., t. 9361; July 1934).—A Chilean species introduced by Mr. Clarence Elliott. A hardy plant needing moist soil, about 3 feet in height, perennial, with flattish panicles of purple flowers.—F. J. C.

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THE GENTIAN GARDEN AT BODNANT.

By Lord Aberconway.

Few herbaceous plants have the remarkable beauty of the Gentians of the Frigida section, the section of which G. sino-ornata is the most widely grown representative.

Tastes in colour are, of course, very diverse, but to most people a really fine blue is the most attractive of flower colours. The wonderful blue colours of the Gentians of this section ranging, as they do, from the deep indigo-blue of G. Veitchiorum to the pale sky-blue of the lighter forms of G. Farreri make one of the most startling of flower pictures.

The colour too is well shown; the flowers are given in vast profusion, and as the plants are prostrate there is no foliage above the blooms, but a dense green carpet to display them. One little crown of *Gentiana ornata*, planted in the spring when it was the size of a postage-stamp, gave no fewer than fifty-three flowers in the autumn. In most free-flowering plants the blooms are fleeting—but that is not the case with these Gentians—the flowers last long and even when the flowers are past their best, the outside of the corolla carries on the colour for some days further. The flowers doubtless last the longer because they are apt to close when the sun goes in.

The Gentians in question are, with the exception of *G. sino-ornata*, not the easiest of plants to grow, but when they do succeed they are most prodigal of increase, and to assume a six-fold multiplication when one divides them in spring is a very modest estimate.

Their beauty, their difficulty, and the fact that when once established they can be had in any quantity, made it seem appropriate that

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they should have at Bodnant a little garden to themselves. And there was another reason—they demanded isolation—for who, when such a Gentian is in flower, could look at any other nearby plant?

So the little garden was constructed, firstly so as to display their beauties to advantage, and secondly to suit their somewhat fastidious needs. This latter was, of course, the more important consideration of the two. Advice had indicated, and experiment had confirmed, that good drainage in winter and moisture in summer were indispensable, that plenty of humus was desirable, and that lime was poison. lime is an imported luxury at Bodnant, there was no temptation to add it to the soil; but our stiffish loam had drainage added to it and remained well down, while the top nine inches which the roots would chiefly traverse was specially made up of gravel as to one half and of either peat or leaf-soil as to the other half. Incidentally, leaf-soil was found to be the better of the two. Next came plans for moisture in summer. Fortunately, the water supply available was abundant. soft and warm, and under considerable pressure; so a 11/2-inch lead pipe was laid underground the length of the garden, and ½-inch brass uprights were soldered to this at intervals so as to stand 12 inches out of the ground, each terminating in twin spray nozzles such as are used on knapsack and other sprayers. When the water is turned on, as it is in dry summer weather, every other day for an hour or so, a fine smoke-like mist covers the garden and waters every plant gently but thoroughly.

The site chosen for the little garden in the autumn of 1932 was a strip of ground 100 feet long at the edge of the park behind an existing rock garden. The shrubs edging the latter gave a background on one side of Erica stricta with some upright Irish Junipers about 6 feet high among them. At each end of the site was a fine clump of Garrya and nearby a big plant of Eucryphia pinnatifolia. So on three sides the new venture was fortunate. On the park side—to the south—the view was good, but a fence was necessary in the foreground and there was nothing on the site to conceal it. Therefore, to meet this difficulty, when a curving path was excavated up the centre of the site, the turf from it was built up against and inside the fence, nearly to the top thereof, and this was backed with soil so that there was a slope from the top of the turf bank to the path.

Weathered stones, the debris from a cliff, were to be had for the carting, and nothing forms a better background for prostrate plants than well-shaped large-sized stones; and so, although no rock garden was planned, these stones were used to form ridges to divide the site into small curved valleys branching from the path. Between the stones along the ridges were planted good-sized plants of Azalea amoena, plants of compact yet graceful shape that associate especially well with rocks. The top of the turf bank—a dry and sunny site—was planted with Yuccas and with two large groups of Potentilla fruticosa Vilmoriniana, a small shrub, whose silver foliage and pale yellow flowers, borne in the autumn as well as in the summer, seemed a good

foil for the Gentian blue. Lastly, the special compost was spread over the valleys, and where it came to the path the edge was supported and kept from the traffic and the dampness of the path by an inconspicuous bank of flakes of stone some six inches high.

All was now ready for the Gentians. Some seedling plants from boxes were put out in the autumn, for we find that Gentians do better in the open through winter than coddled under glass, though they do require looking over when alternate frost and thaw lift small seedlings from the ground. The divided Gentians from existing beds were, however, planted in the spring after they had begun to grow—undoubtedly the best time for such planting.

They were planted one kind to a valley. First came G. Veitchiorum (fig. 138), both the old kind and Captain Kingdon Ward's recent finding, the latter with rather a darker and smaller flower. An easy grower, this, with an amazing wealth of bloom, but not so prolific in division as some others. Then came G. gilvostriata, Captain Kingdon Ward's new introduction, at first (and wrongly) supposed to be G. setulifolia; a plant with silvery foliage like our encrusted Saxifrages and short open recurved bells of pale blue with darker markings, of the same type as G. ornata, but lacking some of the beauty of colour of the latter. There was no great stock of this at first, and it had the end of a ridge and not a valley—too hot and dry a place for a summer like that of 1933; so this spring, when it was divided, it was moved across the path to a north-facing slope which seems to suit it better. This Gentian flowers freely and early in August—a plant 6 inches across had 24 blooms open and a further 34 to come.

Next came G. prolata—the earliest of the Frigida section to flower; the flowers are deep blue, but rather small; a good grower, but hardly comparable in beauty with the others (fig. 138).

Two of the little valleys were bigger than the rest; to these were allotted G. Farreri (figs. 139, 140) and its hybrid with G. sino-ornata, known as $G. \times Macaulayi$ after its first raiser Mr. Macaulay of Kirnan, the doyen and master of Gentian growers. G. x Macaulayi, taken all round, is probably the best of these Gentians. It is earlier than G. sino-ornata and easier than G. Farreri or G. ornata, although the last named with its very open flower, compact growth, and freeflowering habit is to my taste perhaps the most beautiful. At any rate $G. \times Macaulayi$ fills its valley very completely, and is usually voted the best of the set. The form known as 'Wells' variety' has probably the largest flowers-but there is not a great deal of difference between the forms of this hybrid. G. Farreri is a somewhat variable species, for there are pale blue and medium blue forms; and it is not too easy to grow, indeed we struggled with it for eight years before it was a real success. It is grown to perfection by Mr. HARLEY at Devonhall, and it seeded freely with him there—until his bees were given up! In beauty it is a very close rival to $G \times Macaulayi$.

Of two Gentians I speak with diffidence—of G. hexaphylla and of G. Lawrencei—for we have not yet tamed them; not that they are

wild and vigorous growers—much indeed the reverse. They are difficult with us, and their cultivation is a struggle. But the hybrid $G. \times hexa$ -farreri is comparatively easy and, though a trifle straggly is a really good thing.

My list concludes with two notabilities—firstly, G. ornata, before referred to, introduced by Mr. Hay from Nepal four or five years ago and reintroduced in greater quantity by him in 1932, of which there is now enough in the Bodnant Gentian garden for quite a small valley; and secondly, G. sino-ornata, of which there is enough to fill any space that can be found for it (fig. 141).

If you avoid the two forms of *G. sino-ornata*, one of which makes a fine tuft and never flowers at all, and the other of which flowers a month earlier than the common type and keeps its blooms half closed (fortunately these forms are not in commerce), there is no more wonderful garden plant in a lime-free garden, but you must bear with it with patience, for it is mid-September before it starts its display.

The Gentian garden at Bodnant has proved well worth the labour and the thought expended upon it. It is, of course, still new and somewhat in the experimental stage, but the experiments seem working out successfully, and one can, I think, say of it that when one looks back on the year there has been nothing in the garden more beautiful than its Gentians.

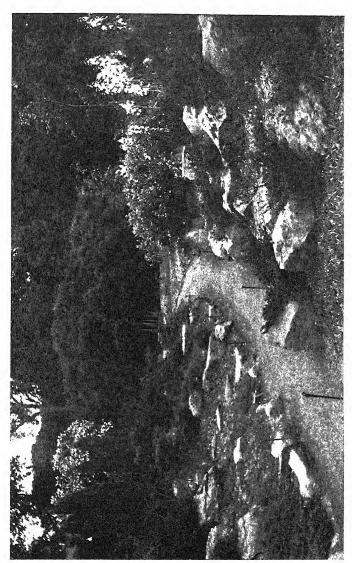


Fig. 138.—The Gentian Garden at Bodnant looking East. G. Veitchiorum in foregenoud ON LEFT, G. PROLATA ON RIGHT.



Fig. 139.—The Gentian Garden at Bodnant, looking West. G. Farreri on right.

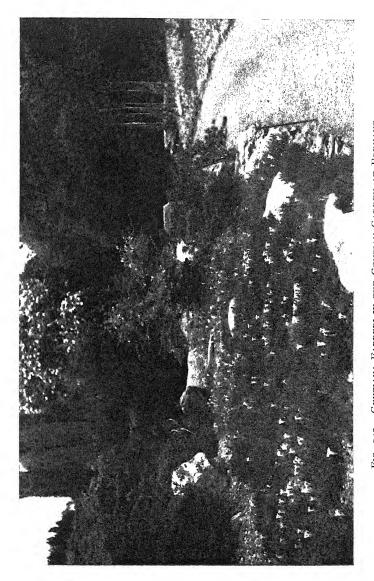
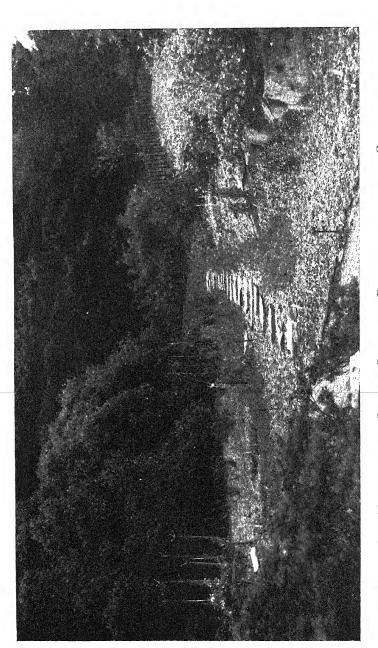


Fig. 140.—Gentiana Farreri in the Gentian Garden at Bodnant.



[To face p. 375. Fig. 141.—Side Valley in the Gentian Garden at Bodnant planted with G. sino-ornata.

HYBRIDIZING IRISES.

By B. R. Long, F.R.H.S.

[Read June 12, 1934; Mr. R. E. SPENDER in the Chair.]

For the sake of brevity, my lecture bears a title which is more general than its matter really warrants, as I intend to confine it to the June-flowering bearded Irises; they are far more varied in colour than those of any other section, and thus offer more scope to those whose aim is the production of beautiful flowers. I cannot pretend to be scientific in my treatment of the subject; no one can possibly forecast exactly what will come from the seeds obtained by crossing any two modern named varieties; they are too remote from the original species from which they are descended. But it is none the less true that after a time one begins to have a few general ideas as to what may occur in some cases.

While BLISS spent much time and effort in trying to throw some light on the scientific side of Iris breeding, it is worth remembering that 'Dominion,' his most noteworthy achievement, was a pure chance, and that the varieties which he raised, which are held everywhere in most esteem, were descended from 'Dominion,' and not from the varieties evolved in his careful experimental work. Anyone may hope to produce something of interest and beauty among Irises without a preliminary study of genetics.

I am going to assume that some have not seen the process of hybridizing. The Iris flower is divisible into three exactly similar parts—the standards, or upper petals, and falls, or lower petals, are the most conspicuous; they are not, however, directly concerned in the process of producing seed. I shall therefore take a flower from which they have been removed to facilitate the examination of the parts concerned—the ovary which will become the seed pod, the stamen which carries the pollen, and the stigma. For the production of fertile seed, the upper surface of the stigma must receive pollen; you will see that as the flower is in three parts the application of pollen to one stigma will fertilize the seed in the corresponding division of the ovary only; therefore each stigma should receive pollen to fertilize the whole seed pod. It would be possible to use pollen from three different varieties on the three separate stigmas and thus obtain seed of different parentage in each division of the seed pod, but in practice this would be unusual, as it would be difficult to mark the separate divisions so as to be able to tell from which pollen the seed in each was derived.

For the application of the pollen different methods are advised. Some use the point of a penknife or a camel's-hair brush; others prefer to use the stamen itself, and I think this is the most convenient method. A stamen is cut out with fine-pointed scissors, or the blade of a sharp penknife, and a little pollen brushed on to the upper surface of each stigma. If you are using a variety with the pollen of which you wish to make a number of crosses you will find with a little practice that the pollen of one stamen can be made to suffice for several flowers—three are easily done, four with care, and even more can be if the variety has a good supply of pollen. However, as one spike of even a seedling Iris blooming for the first time may carry six or eight flowers, it is not really necessary to be particularly economical with the pollen. Last year I had two seedlings of which I used all the pollen of the flowers on the first spike in each case. Sixty crosses were made with one, and forty-eight with the other, and no very particular care was taken to make the pollen go as far as possible.

I have seen it stated that crosses are better made in the forenoon and early afternoon rather than the early morning or evening, but I have not come across any data given in support of this, and I have not often been able to act on it myself.

The flower selected as the seed parent should be one freshly opened to reduce the chance of its having been already fertilized by some insect, though this comparatively seldom occurs. If it has occurred, it is usually possible to see traces of pollen, and if fertilization has occurred some hours before, the stigma will be found to be curling up.

But fertilization by external agency is a comparatively infrequent occurrence; last summer I made a very rough estimate of the number of flowers on part of a bed of Irises, and I left that part of the bed without removing any withered blooms to see how many pods set themselves. There were about 800 blooms, and these only produced three self-set pods. This may be below the average, but as each bloom lasts two or three days, it is clear that the likelihood of a newly opened flower having been fertilized before one uses it is sufficiently remote as to be practically negligible, so that it is not necessary to take precautions against fertilization by insects in any way, even by removing the stamens. Bearded Irises are in any case often not fertile to their own pollen. Some good varieties have been raised by using a variety's own pollen on itself, but not many. My own experience put briefly and in the manner of Sir BOYLE ROCHE—is that self-fertilization gives no seed; the seed does not germinate; the seedlings don't grow, the plants don't flower, and the flowers are no good.

Anyone might well expect that bees would often cross-fertilize Irises—they seem to be positively constructed for the purpose. The bright coloured beard should catch the bee's eye; he should then alight on the fall, enter the space under the stigma and progress under the stamen, rubbing pollen on to his back, and then repeating the process on the next flower, rub the pollen from his back on to the stigma in entering. The bee, however, prefers a short cut and enters half-way down the style arm, thus avoiding the stigma altogether, which is very obliging of him, as it saves the hybridist the trouble of enclosing the flowers in muslin.

...

When a cross has been made, it should be marked in any convenient way, and a note made of the cross. If, as will often be the case, several crosses of the same seed parent are made, it is as well to use successive flowers on the same stem rather than on different stems, as, if the summer should prove a wet one, the ripening of the seed may have to be completed by cutting the stem and bringing it indoors, so the fewer stems to be dealt with the better. The last flower or two to open on a stem should, if possible, not be used, as they are less likely to set seed than the earlier ones; but it may be unavoidable sometimes, and the last flowers by no means always fail to set seed.

Taken on an average over a considerable number of widely different varieties, only about 50 per cent. of crosses succeed in producing seed. Often no seed pod whatever is formed, or a number of apparently good seed pods form, which swell and grow, but will be found in the end to contain no good seed. The amount of seed in a pod is most variable. Some varieties will give 60 or 70 seeds; others seed with difficulty, producing few seeds, perhaps only I or 2. Some expect to find the best varieties among these, but I think this is mere fancy. It appears to me hardly likely that there should be any relation between the numerical quantity of seeds a variety produces, and the beauty of the flowers of the seedlings—I feel sure that a false and subconscious analogy with the works of an artist has crept in. I am aware that BLISS held this view, but the examples he quotes in support of it are few and unconvincing. In any case, most modern varieties are very free seeders.

Depending on the weather, the earliest seed pods begin to turn yellow from the beginning of August, but it will be the end of the month or even September before most are ready. When they are, the pods begin to split open on top. They should then be cut and allowed to complete the process of ripening indoors.

If a seed pod should accidentally be knocked off before it is ripe, it is worth keeping until it ripens, though it is off the plant. I once knocked off a pod as early as July 14, and some of the seed germinated, nor did there seem to be any weakness of growth in the seedlings.

The seed is sown during October. The advice is often given to sow in pots, plunging the pots out of doors. But I think that sowing in pots is a wholly unnecessary elaboration. It is an immense saving of labour to sow in the open ground if considerable numbers of seeds have to be dealt with. The advantage claimed for sowing in pots is that as soon as the seeds begin to germinate, the pots can be placed in a frame or greenhouse, and growth hastened in this way. But the same result can be secured by placing cloches over the seed bed in the open. The seed may be sown in short drills—the length of the width of the cloches, and the drills 2 inches apart. A layer of sand is put at the bottom of the drill, the seeds sown in this, covered with sand and then with soil, so as to be about $\frac{1}{2}$ inch to $\frac{3}{4}$ inch below the surface. The seeds may be sown almost touching each other in the

drills. As they are transplanted when quite small, it is easy to withdraw them from the sand by loosening the surrounding soil with a hand fork, without greatly disturbing the seed which has not germinated, as only a proportion will germinate in the first spring after sowing; the rest is left in the bed.

When the first seedlings begin to appear, which will be about the end of March, the cloches are placed over the bed, and it will save much trouble in weeding if they are left there for the summer after the seedlings have been transplanted, removing them at the beginning of October again. More seed will germinate in the second spring when the cloches are again replaced, and it is worth repeating the process in the third spring. It is not worth while keeping the bed after that.

As the ground has to be occupied nearly three years, it is obviously necessary to keep the space as small as possible—hence the point of sowing the seed as closely as I do, unless, of course, you have unlimited space, and time as weeding becomes necessary.

Watering may be necessary if the weather is dry after germination commences in spring.

The seedlings should be planted out about the second half of May. By this time they will not have made too many or too long roots, and transplanting is easy. As the natural growth of the first roots is downwards, it is not necessary to spread them out much, as it would be if transplanting were delayed. Nine inches apart is quite a sufficient distance. A certain proportion of seedlings will fail—as happens with every other plant. A proportion will bloom after twelve months' growth. Those worth keeping can be transplanted, and those which have bloomed, and are not worth keeping, dug up and destroyed. Also there will always be a certain number of weak growers which will never come to anything, and these should also be thrown out, unless the weak growth should have been the result of accidental damage.

I am quite sure that no one who is beginning to grow seedlings will take this advice, but I am equally sure that after several seasons' experience he will find that there is a proportion of plants which keep alive indefinitely but never bloom, and one gets to know the look of them. I cherished one particular seedling, which happened to be the only one of five seeds which germinated, of a cross of which I rather wanted to see the result. I tended it with care from 1929 to 1933, but it never would flower—and it never indeed looked as if it would!

When these various eliminations have been made, it will be found that there will be plenty of room for those which have not bloomed, though the original planting distance of 9 inches apart may seem small. The late Mr. E. B. WILLIAMSON, a most successful American grower, used to sow seeds 20 or 30 to a foot, in a line, and allow the seedlings to remain without transplanting at all until those which survived flowered.

I have dwelt at some length on these details of seed-sowing, as I think there is a common impression that the raising of any substantial

number of Irises from seed requires a considerable amount of space. This is not so. Five thousand seeds can be sown in a strip of ground 25 feet long by 15 inches wide. One thousand seedlings require a space 20 yards long by 3 yards wide. This is nothing very extensive.

The proportion which will bloom twelve months after planting out is very variable—it depends on the seasons. In 1931, for example, nearly half my seedlings of the previous year bloomed, but this is exceptional. I should think one-third a fair proportion under good conditions. The majority of the remainder will bloom the following year; those which fail are hardly worth keeping further, unless growing conditions have been unfavourable—you will have plenty of foliage from those which do flower.

As to what to keep, that will of course depend on your personal taste. But I hope no one allows himself to be influenced by a name. If you are growing Irises for their beauty, as I hope I may assume you are, do not hesitate to discard a named variety if you raise a somewhat similar seedling which you prefer. Why keep an inferior variety in your garden merely because it has been raised by someone else, and because it appears in a catalogue with a price—possibly in guineas? Throw it out if it is inferior, and keep your own. On the other hand it is wise, I think, to refrain from adding to the multiplicity of names.

A mellifluous name may have a cash value for selling purposes, but adds nothing to the beauty of a flower. If you should wish to show your seedlings in a competitive class at a show you will probably find that whether you like it or not you will have to name them however. But after all the Index of Bradshaw is not yet exhausted, and I do not think anyone has yet started on the London streets, which should afford a supply of names for several years to come.

One point about Irises which is worth noting is that the first flower that opens on a seedling is as good as you will ever get from that plant as a general rule. A seedling will often produce a spike half as tall again and much better branched in its second season as compared with its first, but the individual flowers will not be larger, apart from any slight variation due to seasonal or cultural influences. I have never found any change in colour take place after the first blooming in any seedling I have raised myself. In other words, you can judge a seedling on the first flower it opens—the lost will be no better.

I am going to describe a few series of crosses in which I have tried to pursue a definite aim over a period of some years. I hope that these may be of use in suggesting other series to those who may be beginning, and may even be of some value to those whose experience may be longer than my own for comparison of results. We all, I think, must build on foundations which have long since been laid, and there must be many who have been working on similar lines.

Some of the finest Irises are hybrids of *Iris Ricardii*, which have been raised in France. This species is not easy to grow—in fact, I have only once myself seen what I think was the true plant in bloom.

I preserve a letter from no less an authority than W. R. Dykes, assuring me that hybrids of I. Ricardii are not suited to English gardens. This has not prevented me from growing them with a very fair measure of success, and raising seedlings from many of them. But while it is certainly an exaggeration to say that they are unsuited to English gardens, it is true that some—not all—do require a certain measure of personal attention, a touch of the green thumb perhaps, so a few years ago I tried to obtain from some of the hybrids which already had been made seedlings of hardier constitution. I have tried the following either as seed or pollen parents—sometimes one, sometimes the other—but principally as seed parents:—'Mlle. Schwartz,' 'Mlle. S. Autissier, 'M. Cornuault,' Micheline Charraire, 'Mme. Durand,' 'J. B. Dumas,' 'Mme. Cecile Bouscaut,' 'Souvenir de Loetitia Michaud, 'Mme. J. Vermoux,' 'Gargantua,' 'Magnifica'—a fairly representative selection. I have had individual seedlings from the majority of these which proved hardy, but on the whole those descended from 'Mlle. S. Autissier' were the best growers. This variety is not a very well-known one; it is a bicolor with light blue standards and red-purple falls, a very large but floppy flower, but of good growth and well branched. It was raised by M. Denis, the parentage given being 'M. Chaber' × 'Oriflamme,' 'M. Chaber' being a Ricardii seedling. Pollen of such widely different varieties as 'Parisiana,' 'Opera,' 'Romola,' 'Tenebrae' and 'Valkyrie' all gave some quite hardy seedlings. Those from 'Valkyrie' were, however, easily the best growers, and some had very large flowers-moreover, the substance of 'Valkyrie' had neutralized the floppiness of 'Mlle. S. Autissier.' Further crosses were made from some of these, particularly two, one of which was like 'Valkyrie' in colour, but a lighter shade, and with a larger flower, the other much the colour of 'Romola.' In the majority of cases seedlings from these, using as pollen parent some named variety descended from 'Dominion,' were quite satisfactory in growth; a curious exception was that seedlings from a cross of the Valkyrie'-coloured seedling and 'Romola,' which is such a healthy grower, all rotted in winter with the utmost freedom.

The seedlings of best growth came from pollen of the varieties 'Mrs. Valerie West' and 'Miss Grace Sturtevant.' At the same time, for purposes of comparison, 'Valkyrie' itself was crossed by the same two varieties, and these seedlings were, if anything, not such good growers as those which had the Ricardii strain introduced from 'Mlle. S. Autissier,' and the latter were better branched, larger flowered, and of brighter colour.

The 'Romola'-coloured seedling did not prove as good a parent from the point of view of hardiness of its seedlings, but it combined fairly well with 'Cardinal,' which was rather curious, as 'Cardinal' has never been quite happy with me. These seedlings were at any rate not inferior to 'Cardinal' in growth.

Another of these 'Valkyrie'-'Mlle. S. Autissier' seedlings was a very deep purple bicolor, somewhat suggestive of a diluted 'Dominion.' At

the same time I had a seedling of 'Magnifica' × 'Robert W. Wallace,' also a purple bicolor, floppy, but with very velvety falls. The result of crossing these two gave a set of seedlings on much the same lines as one often sees produced from 'Bruno'—large, stiff, mostly dull in colour, but with velvety falls—though they were quite unrelated to any 'Dominion' variety. They were on the whole good growers, though they had Ricardii on both sides of the family, 'Magnifica' being a Ricardii hybrid.

Apropos of 'Magnifica,' I might mention that I never found any particular merit in it or its seedlings for breeding purposes. As this variety was for some years the largest flowered, it must have attracted the attention of hybridists everywhere, but there are few varieties known to be descended from it in commerce, and I do not think that any of them have attained any general approbation. The investigation of the number of chromosomes in its roots has led to the theory that it should be a good breeder, but in the absence—in fact, I might say, the marked absence—of practical verification, the publication of this theory appears premature.

Rather unexpectedly, among other Ricardii varieties, the best results were among seedlings of 'Mme. Cecile Bouscaut.' This is a most beautiful Iris—it possesses in a high degree that glistening silky texture which is the almost exclusive distinction of Ricardii hybrids, and which makes most other Irises of similar colour look commonplace and crude. You have only to compare it with—but perhaps I had better refrain!

"It must be ages since I ceased
To wonder which I like the least,"

among many varieties of somewhat similar colour. But 'Mme. Cecile Bouscaut' is among the more delicate varieties, and is also a very slow grower. Some seedlings I have had from it are not only much hardier, but are rapid growers, and seedlings of some of these seedlings show an acceleration so acute as to be almost excessive.

'Moonlight' × 'Mme. Cecile Bouscaut' gave a set of very free growers, mostly in shades of cream-white or bluish-white. I selected one to breed from, a large-flowered cream-white, which was also a rapid grower—decidedly better in that respect than 'Moonlight,' and some of its seedlings inherited this quality in an enhanced degree. In particular, a cross with the pollen on 'Mrs. Valerie West' as seed parent gave as one of the seedlings a pure white which increased more rapidly than any other variety I have had. Another from the same cross was a shot pink of considerable vigour, but possibly rather tender—I have not had it long enough to be sure, however. Another cross of 'Mme. Cecile Bouscaut' which gave good growers was with 'Mrs. Charles Pearson'—the seedlings were not good flowers, but one showed a tendency to give seedlings better than itself without loosing any of its vigour. By crossing it with 'Dream,' seedlings of pale shades of pink, white tinted pink, and white with pink-lined falls were obtained,

which were good growers, and retained something of the silky sheen of 'Mme. Cecile Bouscaut,' though not its size.

The production of a pure white Iris from 'Mrs. Valerie West' may seem surprising, but among a number of seedlings raised from the Ricardii variety 'Micheline Charraire'x 'Mrs. Valerie West' were three pure whites, very similar to each other, taking after 'Mrs. Valerie West' in form. They are not as free in growth as that descended from the 'Moonlight'x 'Mrs. Cecile Bouscaut' seedling, but so far they have come through three winters successfully.

I shall now leave the Ricardii hybrids and turn to another aspect of Iris raising—the production of large yellow Irises. Though every catalogue has the finest large and tall yellow Iris yet produced, they are not yet two a penny. So why not raise your own? It may well be as good as someone else's 'Sudden Glory,' that golden flower at a golden price—that is, if you can manage to see 'Sudden Glory' as it is, and not be overawed by its catalogue description—and the fact that it has one, though many never seem to become inured to the printed word. When I read some more than ordinarily inspired lyric of the composer of a catalogue I try to bear in mind a description of 'Iris King,' when it was a novelty, which I have in an old catalogue. 'Iris King' is there described as growing 4 feet—and the rest of the description is equally tall.

However, to return to the subject of yellow Irises. In 1928 I happened to cross 'Moonlight' by 'Valkyrie.' Several of the seedlings bloomed in 1930, and among them were several yellows of good height, size, and colour. I brought one of them to a show that year; Professor MITCHELL, the well-known American raiser of many glorious Irises, happened to notice it-I do not think anyone else did-and inquired its parentage. He told me he had known of other cases of yellow Irises occurring from crosses of white × bronze Irises, though he was surprised that so dark coloured a variety as 'Valkyrie' had given a clear yellow. No doubt several people, as often happens, had found the same formula at the same time. When these seedlings bloomed I naturally proceeded to make a series of white × bronze crosses. To take named varieties first, 'Moonlight' x 'Mrs. Valerie West' (fig. 142), 'Micheline Charraire' x 'Mrs. Valerie West,' and 'Mrs. Valerie West' x 'Theseus,' all gave yellows among the seedlings. The last cross was rather a case of making something to order. I was visiting Messrs. Wallace's nurseries at Tunbridge Wells; Mr. WALLACE had picked a flower of 'Theseus' to show someone, and then asked me if I would like it, adding, "Perhaps you'll raise a yellow from it." It is rather a good yellow too, though perhaps a little tender. I also used several seedlings, and yellows occurred among seedlings from crosses of 'Moonlight' × a light bronzy seedling of I. ochracea coerulea, and from 'Mrs. Valerie West ' and 'Valkyrie,' both crossed by the cream-white seedling of 'Moonlight' x' Mme. C. Bouscaut' I mentioned before. Other crosses of various white and bronze seedlings have also given vellows, so the formula seems of fairly wide application.



Fig. 142.—White Iris Seedling One Year Old. Mrs. Valerie West \times (Mme. Cecile Bouscaut \times Moonlight). [To face p. 382.

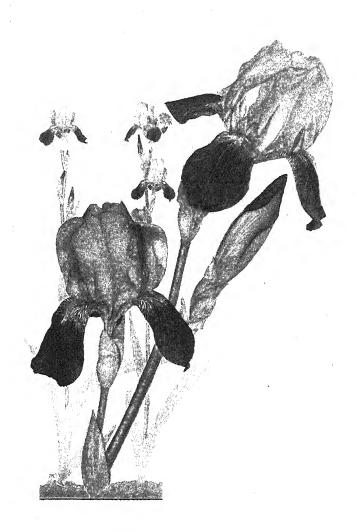


Fig. 143.—Iris 'Ambassadeur.' A.M. 1927.



Fig. 144.—Iris 'Mount Royal.'
A.M. 1930.



Fig. 145.—Iris 'Moonbeam.'

[To face p. 383.

To go back for a moment to the results of the 'Moonlight' × 'Valkyrie' cross, there was one seedling which, though extremely ugly, was interesting, as it suggested a cheap and pirated edition of that celebrated variety, 'W. R. Dykes'—very similar in size and shape, but a dirty greenish-yellow and the falls blotched with brown. I do not suppose it will ever be known from what 'W. R. Dykes' was raised, but I should be very much surprised if it was not raised from a white × bronze cross.

The other method of raising yellow Irises is by crossing some other coloured variety by a yellow variety, hoping to get some improvement. Many have used, and many more will use, the variety 'W. R. Dykes,' so for what it is worth, I shall give my experience of seedlings of the second generation from that variety. In 1928 Mr. Murrell, of the Orpington Nursery Co., very kindly gave me some pollen of the famous yellow. Of five crosses I made with it only one succeeded, that with 'Dejazet' as seed parent. Several seedlings flowered in 1930, one of which was an exceptionally large-flowered pure golden yellow.

The first seedlings descended from this flowered in 1932 and 1933. I should have had a number more this year, and some from those which flowered in 1932, if I had not had to move them in January. However, there was a fairly wide range of colour from those which have flowered.*

'Farandole'—a light pinkish blend—gave several cream varieties of very large size, some light blended lavenders of no particular note, and one deep sulphur yellow, with falls overlaid with a curious coppery sheen.

'Le Grand Ferré,' another pinkish blend, gave varied shot shades containing much yellow, of very large size, though rather lacking shape and substance, also a pure white, a pure sulphur yellow, and a lavender—but none of these of much note.

'Mrs. Valerie West' gave some nondescript deep bronze shades of extraordinary size, and several not so large, in much better colours, old gold blends, which succeeded in being deep without being dull. 'Deputé Nomblot' also gave a huge dull bronze. 'Moa' gave several pale yellows.

'Melchior' gave what was probably the best seedling of all of these, a pure deep yellow self; there were also two pure whites. This is interesting, as 'Melchior' is deeper in colour than 'Mrs. Valerie West,' and the production of these yellow and white seedlings from it suggests that it would be well worth anyone's attention for the production of light coloured varieties—which takes me from the subject of yellow Irises to the concluding series of crosses I am going to describe—aimed at the production of Irises of 'Dominion' race in light colours.

^{*} I had to move my Irises from Kent to Lancashire in January this year, from a low-lying area to one a thousand feet up in the north. They are growing well in spite of being moved in the worst month of the year, but are not yet in flower, and I have, therefore, to depend on descriptions instead of specimens.

'Dominion' itself I have never used—or even possessed—I suppose I am one of the very few who grow Irises who could—and would make such an admission. 'Romola' seemed a promising startingpoint; its colour is pleasant, its growth is admirable, but the form of the flower is execrable. Unfortunately it transmits its form almost invariably, and consequently numerous seedlings raised from it with 'Imperator,' 'Mlle. S. Autissier,' 'Nancy Orne,' 'Morning Splendour,' 'Chasseur,' 'Le Corrège' and from various seedlings, all were thrown out on sight. Only one Iris had sufficient merit to overcome in some degree 'Romola's' defects-that was 'Melchior'; it did not quite succeed, but very nearly, and one seedling was of good clear light crimson with very little purple and of tolerable form. 'Tenebrae,' of dark colour but good form, was tried on various light-coloured varieties, such as 'Olympus,' 'Nancy Orne,' 'Dejazet,' 'Iris King,' 'Mlle. Schwartz,' 'Imperator,' but the seedlings from these, though better in form, were too dark in colour and so suffered the usual fate.

'Bruno,' 'Moa,' 'Cardinal,' 'Grace Sturtevant,' 'Melchior' and 'Nanette' were tried with varying success, or lack of it, but to cut a long story short, 'Mrs. Valerie West' proved the one from which a range of varied light colours was easily obtainable. I have already mentioned some of these; the white and the pink variety raised from the seedling of 'Mme. Cecile Bouscaut' and 'Moonlight'; the three pure whites from 'Micheline Charraire,' the yellow from 'Theseus.'

'Reverie' x 'Mrs. Valerie West' gave a varied set-several of what are described as "pastel variegatas"—a dreadful designation, meaning varieties with standards of slightly blended yellow, and bright falls toned with yellow; another with white standards tinted lilac, and bright violet purple falls; and another a light rosy purple slightly blended. 'Le Corrège' gave a very light bright copper red, 'Valkyrie' a bright-coloured variegata, and a seedling of 'Mlle. S. Autissier' × 'Valkyrie' gave another variegata, similar in colour to the 'Old Princess Victoria Louise.' Finally, one seedling of 'Silver Queen'× 'Mrs. Valerie West' was sky-blue. So that the range of light colours obtainable from quite a small number of crosses of 'Mrs. Valerie West' is extraordinarily wide.

Two years ago I contributed an article to the Year-book of the Iris Society on the raising of Irises of the type known as Variegata plicatas, and I had hoped to be in a position by now to have some more information on this subject, in particular as to improvements in height and spacing, based on the results of a number of crosses made two years ago. Now none of my seedlings of last year accompanied me North; they are fortunate in enjoying the hospitality of my friends Major and Mrs. Norton, of Billingbear Park, Wokingham, in whose extensive garden they are growing under more favourable conditions than I was able to provide for them.

But owing to the midwinter transplantation, and the prolonged drought, no conclusions can be drawn as to their normal height, though

many are now in flower. 'Los Angeles,' planted at the same time, is just coming into flower on stems 18 inches high. But at any rate Variegata plicatas are arriving from these crosses which should give greater height. For example, I had had a number of these plicatas from 'Chasseur' × 'Ophelia.' To get greater height I raised seedlings from 'Chasseur' × 'Harpalion,' and from 'Ophelia' × a tall pink seedling, and then crossed some of the seedlings from these crosses. There are Variegata plicatas now flowering as a result, which have rather larger and better spaced flowers than those of the original 'Chasseur' × 'Ophelia' set, and should also be taller.

MASTERS LECTURES, 1934.

HEALTH AND DISEASE IN PLANTS.

By Dr. W. F. BEWLEY.

[Read May 8, 1934, Sir Daniel Hall, F.R.S., in the Chair; May 9, 1934, Mr. A. D. Cotton, F.L.S., in the Chair.]

DISEASE in plants, as indeed in all forms of life, is in reality a struggle between the host and the invading parasite. Sometimes the battle sways in favour of one side and sometimes in favour of the other. The final result must depend upon which side is the stronger.

It is convenient to consider the subject in three sections:

- (I) The health and susceptibility of the host.
- (2) The vigour of the parasite.
- (3) The onset of disease itself.

To these will be added a discussion of control measures.

Health and susceptibility of the host plant.—The type of plant which is susceptible to disease cannot be described in general terms. It depends upon the natural habit of the plant and the organism which causes the disease. Usually, if the form of the plant is abnormal and unbalanced, it becomes susceptible to attack.

In many cases a soft, water-gorged plant, with thin cell walls is most susceptible. Such plants usually contain a good deal of nitrogen and are low in carbohydrate; they take up large quantities of water from the soil. The soft unripe shoots of roses are particularly susceptible to powdery mildew, and the succulent young growth of the tomato to the development of "Stripe" and certain virus diseases. On the other hand, hard, badly nourished plants are also susceptible types. In the tomato, plants with thin hard stems near the ground show the symptoms of Verticillium wilt very severely.

In a healthy plant the form closely resembles its natural habit. Growth is steady, balanced and unchecked; while the foliage is of good colour.

The health of the plant is affected by the variety and strain in relation to environmental conditions. It is not safe to rely upon all strains of a resistant variety being equally resistant, for unless a variety is a pure line strain in every respect it is liable to vary when grown on different nurseries or gardens. Some strains may be resistant under all conditions, while others with a limited resistance may be resistant only under certain limited conditions. The latter will prove satisfactory only when the environmental conditions are suitable.

Healthy plant growth also depends upon the physical and chemical condition of the soil. The condition of the sub-soil is of particular importance to deep-rooting plants. Experience of glasshouse and market-garden work indicates clearly that the physical condition of

a soil is more important than the chemical aspect. Manurial treatment is no longer a difficult problem, and a soil which is chemically poor can be corrected at will. The physical improvement of a soil is much more difficult to attain, but those who have attempted cold-frame, hot-bed or glasshouse work on hard, unkind soils realize how fundamentally important is this matter. For this work, the ideal soil must contain a large proportion of humus to keep it open, retain the moisture, and allow a free circulation of gases throughout the entire mass. Such soils are found in successful market gardens. Usually they are the result of many years of careful management. Soils deficient in humus, especially those containing a good deal of clay or silt lie cold and wet. Girculation of gases is slow, carbon dioxide accumulates, and the result is slow root development accompanied by disease.

Investigation at Cheshunt has shown that when large quantities of carbon dioxide are present in the soil, plant roots are injured, and are readily invaded by some fungi including different species of Fusarium which produce a general root rot. In one experiment with a first crop of tomatos in virgin soil, carbon dioxide was introduced by a series of pipes laid on the surface and covered with a mulch of long horse manure. The carbon dioxide accumulated in the top five inches of soil, and a severe attack of root rot due to Fusarium sp. resulted. Tomato roots in adjoining plots were almost free from root decay. Experiments in which air was drawn through the soil from buried pipes resulted in cleaner root growth than in the control plots. These experiments emphasize the importance of the free circulation of air in the soil and the withdrawal of carbon dioxide.

The chemical aspect of the problem fluctuates between unbalanced food values and the presence of compounds injurious to plants. The symptoms of potash, nitrogen and phosphate deficiencies in plants are well known, and it will suffice merely to summarize them. Potash starvation shows itself readily in the foliage. The edges of the leaves become pale green in colour, turning yellow and finally brown as the tissues die. This discoloration may spread inwards until most of the leaf is involved. In the case of the tomato, the fruits turn a yellowish-red colour, and the ripening is uneven and blotchy [3]. Further, many plants become highly susceptible to certain diseases when potash is not available in sufficient quantity. The following table illustrates the relation between manurial treatment and the incidence of "Stripe" disease on the tomato.

V ariety.	Treatment.	Per cent. Plants attacked by "Stripe" Disease.
Comet.	*C.A. without potash.	65
,,	Unmanured.	42
,,	C.A. with horse manure.	37
,,	C.A. without phosphate.	34
,,	C.A.	34

^{*} C.A. = complete artificials.

Variety.	Treatment.	Per cent. Plants attacked by "Stripe" Discase.
Comet.	C.A. without nitrogen.	28
,,,	Double C.A.	28
Kondine Red.	C.A. without potash.	27
,,	C.A. with horse manure.	27
,,	Unmanured.	25
,,	C.A. without phosphates.	23
,,	C.A. without nitrogen.	16
,,	Double C.A.	12
,,	C.A.	12

It will be seen that "Stripe" disease is most severe when potash is withheld. It is severe when nitrogen is given and reduced when nitrogen is omitted. So important are these relationships that the application of sulphate of potash has become the recognized treatment for this disease in commercial nurseries.

Adequate supplies of potassic fertilizers mature the tissues of most plants and induce the formation of firm leaf growth resistant to many diseases. They impart bright colouring to flowers and fruit, but in excess the flowers are relatively few and small.

Plants suffering from nitrogen starvation are usually stunted, with weak stems, pale green foliage and small leaves. Pale yellow areas appear between the veins and extend gradually until only the extreme edge of the leaf retains the normal green colour. Adequate manuring with nitrogenous compounds induces good leaf production, a dark green colour, and a sturdy habit, while phosphates increase the root action and impart better flavour to some fruits.

It is commonly stated that heavy dressings of nitrogen induce luxuriant vegetative growth. This is not entirely true. Experiments at Cheshunt were conducted with tomatos whereby different plots received 15, 30, 60 and 90 tons of horse manure an acre. In one series the soil was kept as dry as possible without injuring the crop and in another copious waterings were applied. The experiment was continued for three years. During a bright sunny summer no difference in vegetative growth was observed on the different plots in the dry soil, but in the wet soil there was a softening effect on the plots receiving 60 and 90 tons horse manure an acre. During a dull summer the heaviest dressings produced a slightly soft growth in the dry soil, but there was a decided softening effect in the wet soil. These experiments proved very clearly that manuring must be regulated in accordance with the weather.

Experiments in relation to potash supply are equally interesting, and it has been shown at Cheshunt that the effect of potash on the tomato and some vegetables resembles to some extent the effect of abundant sunlight. Briefly, in dull wet seasons the tomato crop requires more potash than in bright sunny seasons, and in fine, sunny years like 1933 dressings of potash could be reduced to a minimum while greater amounts of nitrogen were necessary [4].

These results may have wide application, and the principle of manuring in accordance with the weather must receive careful consideration. They suggest that at least some of the fertilizer should be applied in the form of a top dressing.

Poisoning effects are observed in some soils. Some of the best known are those produced by salt in districts near the sea, by chlorates in nurseries where cheap fertilizers were used during the war [8], and those produced by coal gas leaking from a buried pipe. In each case the effect is serious.

Other cases are not so obvious and are all the more dangerous. These occur in soils that have been heavily manured for a number of years and which are close, cold and wet for long periods. Little is known about these poisons, but they appear to be of a nitrogenous nature and their investigation is long overdue. They received some attention by Schreiner & Skinner [9] some years ago.

Work at Cheshunt has shown the importance of these poisons which accumulate, chiefly but not entirely, in the subsoil of old nurseries. When taken up by plant roots they cause injury and induce susceptibility to infection by fungi and bacteria which are impotent against healthy roots. Such poisons are undoubtedly connected with the problem of "soil sickness." The effect of these injurious influences is well known in many plants. Yellow blotches appear between the veins of the leaves, shoot growth becomes pale and weak, and the stems are frequently hollow. Root rot occurs, and an impoverished growth of the plant is the final result. This can be seen in tomatos, cucumbers, roses, chrysanthemums, and indeed in most plants.

The temperature of the soil and the air has an important effect upon health and disease, and while all good gardeners are careful to regulate the air temperature of their greenhouses, they are not always so considerate about soil temperature.

The rate of growth of the roots depends to a great extent upon the soil temperature. Root growth in cold soils is slow, and roots which grow slowly are most susceptible to infection by soil organisms. Cases of this damage can be seen any year in districts where the soil is heavy and wet. They appear in market gardens in the open, and also amongst such glasshouse crops as tomatos.

Particularly important is the temperature of the soil at planting time. With tomatos, root injury results at soil temperature below 57° F. in heavy soils and at 53° F. or 55° F. in light soils, and what is even more important the injury, including as it does infection by fungi and bacteria, gradually increases as growth proceeds.

The injurious effect of low temperatures is most severe in close wet soils: thus in cold districts it becomes increasingly important to see that the soil is open and well drained. On the other hand, high soil temperatures can be injurious especially in light sandy soils.

The wetness of the soil and air are important factors in the health of plants. For best results the soil must be kept at a uniform degree of wetness, but its water content must not be increased at the expense of the air. If this happens, the roots either cease to perform their

functions or do so very slowly. The intake of water is reduced, and infection by fungi and bacteria is likely.

Cucumber plants wilt when the soil is waterlogged and recover if the water is drained away within 20 hours. Delay causes death. Although the presence of stagnant water in the soil causes the formation of plant poisons and is a common cause of root rot, this form of injury does not occur if the water is clean and moving as a stream. On the other hand, a dry subsoil is equally dangerous, and winter flooding of the soil has become general practice in glasshouse work. In the tomato, a dry soil causes "Blossom end rot" of tomato fruits, and a peculiar kind of brown discoloration under the skin occurs if the soil is too dry and too hot. In cucumbers, a dry soil can cause localized shrivelling of the young fruit, a condition similar to "Blossom end rot" of the tomato. In grapes necrosis of the berries can arise from a similar cause.

The efficiency of plants is greatly increased by abundant sunshine, for under such conditions they manufacture large quantities of starch, and the carbohydrate-nitrogen radio of such plants is high. This ratio is of great importance in determining the health and vigour of plants. Where it is high, plants develop dark strong leaves: they flower abundantly and fruit production is excellent. A low carbohydrate-nitrogen content tends in most plants to weak growth and susceptibility to disease.

Although an attempt has been made to describe the effect of the above factors on the health of plants, it must be realized that in Nature these influences are so interwoven that it is almost impossible to separate them. In the present state of knowledge it is only possible to interpret experimental results in terms of temperature, humidity, soil treatment, etc., but it would be easier at times for the practical man if he could be told that a certain type of growth is resistant while other types are susceptible to the disease in question. The chief difficulty lies in preparing a description which will present a true picture. Fortunately for those who grow plants, it is reasonably true to assume that if a plant is grown in such a manner that it conforms to its natural habit it is resistant to most troubles. Susceptibility creeps in when the growth form becomes abnormal, and especially when it is upset by a sudden check, caused by unsuitable conditions.

Strength of the parasite.—The vigour of the parasitic organism depends upon its previous history. Organisms which usually live in a saprophytic condition upon dead material may be weak parasites of a living plant when they are transferred to it from dead material, but after being nourished on the living host the strength of their parasitism seems to be increased. This is seen in the stem rot of the tomato caused by Botrytis. When a plant is inoculated with spores taken from a culture, the rate at which the tissues are destroyed is relatively slow, but if transfers are made from one plant to another the rate of destruction increases rapidly. This is important in disease control, for it shows the importance of checking attacks at the earliest opportunity.

The temperature of the air and soil is important, for each parasite has its own range of temperatures at which it is able to infect the plant. Above the maximum and below the minimum infection does not occur, but within these two limits lies a definite optimum temperature at which the disease is most severe. Thus Verticillium is generally a low-temperature fungus, while Fusarium is favoured by high temperatures. Verticillium albo-atrum causes little damage to the tomato below a temperature of 40° F. or above 77° F., but is most serious at about 73° F. [2]. It is important, therefore, to know the temperature relationships of the various parasites.

High atmospheric humidity favours the development of many leaf and fruit diseases, because it enables spores to germinate and penetrate the tissue, but a moderately dry windy day favours the dispersal of the spores.

The disease complex of host and parasite.—When investigating outbreaks of disease it is important to discover the source from which infection arose or is still arising. In addition to the transmission of disease by seeds, cuttings, imported plants, etc., there is the water supply. The importance of a clean water supply is not sufficiently appreciated and deserves careful consideration by every grower.

During the present dry weather many large growers in some parts of the country are at their wits' end to find a supply free from salt. They would have saved themselves considerable worry and expense had they taken the precaution of having the water supply tested before purchasing the land now occupied by the nursery.

Apart from chemical pollution, there is the question of contamination with disease-producing organisms. A large number of water supplies have been examined at Cheshunt from this point of view, and it has been proved that water from ponds, slow-flowing streams, and shallow wells is frequently contaminated with pathogenic fungi and bacteria. Water from a supply company can be regarded as clean. Dirty storage tanks are also a source of contamination [1].

Cleanliness is of vital importance in nursery work, and all weeds, heaps of plant refuse, etc., should be destroyed at short intervals. They are constant sources of infection. It must also be remembered that diseases are carried about by workers, insects and animals. Direct proof of this has been obtained in innumerable instances.

Environmental conditions affect the onset and development of diseases so seriously that many gardeners are inclined to attribute diseases to these causes only, forgetting that the causal organism must be present before a particular disease can develop. Nevertheless it shows how important are cultural conditions in health and disease.

Prevention of disease.—The necessary precautions for preventing disease have been described fully in numerous publications by many authors, and there is no time to discuss them here, despite their importance.

It must be said, however, that if plants are grown in a balanced condition, so that growth proceeds uniformly without any period of check, under conditions from which severe changes are absent, they will usually be healthy and resistant to all but the most virulent diseases. Among these diseases are foot rot caused by Phytophthora and Rhizoctonia, wilt caused by Verticillium and Fusarium, and the virus diseases. Against the last, most plants are helpless.

There are, however, many diseases which only follow injury caused by unfavourable conditions, and experience suggests that these are in the majority. If it were not so, it would be difficult to understand how any one could grow a healthy crop, so numerous are these diseases.

Observation and experiment have shown that many root diseases are the result of unsuitable soil conditions. When tomatos are grown in glasshouses under heavy manurial treatment, constant watering and high temperatures, the crop falls after the fourth year and may become unprofitable after seven or eight years. At this stage the soil is said to be "sick." In such soils tomato roots do not persist through the season; they soon develop root rot to such an extent that the entire root system is involved.

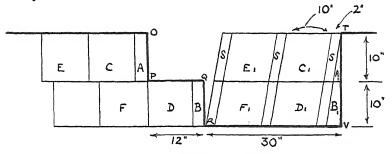


Fig. 146.—" Strawing" the Soil.

O, P, Q, R, V, T = trench. A, B, C, D, E, F = soil in original position. A_1 , B_1 , C_1 , D_1 , E_1 , F_1 = soil in new position. S = straw.

Soil sterilization is now adopted generally as a means of correcting this bad condition, but ten years ago experiments were commenced at Cheshunt to determine if the soil could be improved by some more natural method. These experiments suggest that the development of "soil sickness" is associated to some extent with the disappearance of coarse "fibre" in the form of grass and other roots and the consequent change in physical condition. Large-scale experiments in commercial nurseries have proved that soil sickness can be corrected very largely by applying sufficient opening material in the form of peat, spent hops or clean straw. Of these the last is preferred for reasons of cheapness and efficiency. The method of application is important. The straw must not be dug into the soil in haphazard fashion: it must be placed in layers, as nearly vertical as possible. Clean wheat or oat straw is preferred, and it should be in bales rather than in trusses, for in the former condition the individual straws are not crushed and serve as ventilating channels.

Three tons an acre are applied to the top ten inches and the same amount to the subsoil. The straw can be applied most easily during the process of bastard trenching (fig. 146). First a 2-inch wall of

straw is placed in position, and if fertilizer is required it is scattered over the straw. Then comes a 10-inch wall of soil in which horse manure may be mixed if necessary, then another wall of straw, another of soil and manure, and so on. When the process is finished the land must be heavily watered to wet the straw completely. The effect of the straw is to render the soil more open and porous. After even one year's treatment a heavy clay soil becomes much easier to dig. The straw also stimulates the growth of soil organisms in such a way that the amount of nitrogen available to the plant is decreased. On poor light soil, nitrogen deficiency in the crop following may be very marked, but can be prevented by scattering hoof and horn meal over the straw when applying it. On heavy rich land no signs of nitrogen deficiency can be observed, and the resulting growth of the plants suggests that injurious influences in the soil have been destroyed. The process is finding favour in many parts of the country, but is recommended chiefly for heavy soils. It deserves further trial in connexion with other forms of soil sickness.

For work in small gardens applications of a good type of peat will be found helpful, but experiment suggests that 15 to 30 tons an acre are required. Experiments with burnt earth have shown excellent results from the use of this material. It can be obtained easily in gardens on clay soil, by heaping garden rubbish over an improvised fireplace, and covering the heap with 9 to 12 inches of clay. The heat from the burning rubbish burns the clay which can be broken down to a fine state and mixed at the rate of 1 part with 16 parts of soil.

By the proper use of the above materials in glasshouse, gardens and pot work, the soil may be brought into a good physical state, and the growth of strong clean roots encouraged.

Where root diseases are caused by organisms so virulent that infection does not depend upon bad soil conditions, soil sterilization is the best remedy, and it can be achieved by heat or by chemical means. Actually it is partial sterilization, for it does not destroy all the life in the soil.

Sterilization by heat frees the soil from harmful fungi, bacteria and protozoa, as well as insect and animal pests. It leaves uninjured the ammonifying and nitrifying bacteria which, freed from undue competition of other organisms, rapidly produce large quantities of nitrogenous compounds which are readily available to plants. It breaks down complex chemical compounds, including soil poisons, and restores fertility.

Satisfactory chemical sterilization destroys disease-producing organisms and pests in the soil, but may or may not affect the condition of nitrogenous compounds in it.

Sterilization by heat requires that the soil should be raised to a temperature of 210° F. to 212° F. for a period of 30 to 60 minutes. It can be achieved by passing steam into the soil, by baking it in an oven over a fire, or by passing an electric current through it.

In commercial nurseries steam is generated in a portable loco-type boiler. This may be between 12 and 25 h.p. Usually a 20-h.p. boiler

is employed evaporating 250 gallons of water an hour, which provides sufficient steam to work two full-sized grids in 30 or 40 minutes. New boilers may work at 160 lb. pressure, but for practical purposes 70 to 90 lb. pressure is sufficient.

Steam from the boiler is passed through steam pipes to "grids" or "harrows" buried in the soil, which is heated to the required temperature by steam issuing from the pipes.

This method can be adapted for sterilizing small quantities of soil if required, and in private gardens where a source of steam is available it has proved of great value. For this work, however, small baking ovens, and the new electric sterilizers are becoming popular. Full details of the above methods have been published recently [5].

Chemical sterilization depends upon saturating every particle of soil with an efficient sterilizing liquid, which must have left the soil before plants can be introduced. There are many compounds on the market, but formaldehyde is preferred for preventing fungus and bacterial diseases.

In connexion with soil sterilization it must be remembered that a sterilized soil is a better medium for the growth of fungi than one that has not been sterilized. Thus any attempt at sterilization must be thorough. Half-hearted attempts at sterilization can only have disappointing results.

Chemical sterilization is conducted when the houses are empty and the soil free from plants. Where formaldehyde is used, I gallon of the 40 per cent. solution is diluted with 49 gallons of water and applied to between 10 and 18 square yards according to the severity of disease during the previous year.

During the growing season, however, sterilizing fluids may be used at times if diluted sufficiently. Thus some root diseases of the cucumber are often treated by watering the beds with emulsified cresylic acid at a dilution of r in 2000. This has the effect of cleaning the beds to some extent and protects new roots which may be formed.

The soil temperatures which prevail in this country during the winter and early spring are too low for satisfactory root growth, and considerable improvement in early crop production can be achieved by adopting methods for warming the soil.

The electrical method which was first applied in Scandinavia is being used in many parts of the world. It depends upon the use of special cables which are buried at a suitable depth in the soil and heated by the passage of an electric current. For commercial work in the open and in glasshouses, the method is too expensive for general application owing to the present cost of electric current, but it should appeal to those in private gardens, owing to its flexibility and ease of control. It is particularly useful in frame work, because an insulating layer of coke or ashes can be laid beneath the frames, and by insulating the sides also, loss of heat can be reduced to a minimum, with a consequent saving in current consumption. The cables are buried in sand and covered with soil to a depth of twelve inches. In America it is claimed that better results are obtained by laying the cable on the

surface between the plants, but this requires confirmation. A thermostat must be inserted in the circuit, because it reduces the current consumption and provides accurate temperature control.

A considerable saving in running costs can be obtained by circulating hot water in buried pipes of small diameter, and this process is sufficiently cheap to warrant its trial by growers who can afford the initial capital outlay. This method has been investigated at Cheshunt for several years [7], and the following system is recommended as a basis for trial.

The apparatus required includes:

- A hot-water boiler for providing water at a temperature of 140° F.
- (2) An electric pump with starting device controlled by a soil thermostat.
- (3) A quantity of one inch pipe.
- (4) A hot-water storage tank to prevent overheating the boiler when the thermostatic control stops the pump.

The pipes are buried 2 feet 6 inches to 3 feet apart at a depth of 2 feet. This depth is necessary to provide uniform heating of the top soil and prevent excessive dryness. The capital outlay is estimated at about £450 an acre, and the fuel costs at about £5 a week.

Experiments suggest that for frame work a soil temperature of 60° F. is ample. Tomatos require a temperature of 65° F. at planting, which can be raised gradually to 75° F. or 80° F. after the first truss has set. Cucumbers are better at a higher soil temperature of 85° F. to 90° F.

The effect of soil-warming is to stimulate root development, prevent many root diseases, and provide earlier maturity. It also appears to correct soil sickness. The process is still in its infancy, and will no doubt be modified considerably in time, but it has a great promise. It may ultimately replace soil sterilization to a great extent, although it can never be effective against some of the more virulent diseases and probably has no effect on soil animals. Eelworm attack would probably be increased by soil-warming, for this pest thrives in hot dry soil conditions. In the open soil-warming it accelerates growth considerably and prevents injury by frost to a large extent.

The general use of fungicidal sprays and dusts is well known, but attention should be drawn to the increased efficiency which has been given to spraying by certain new products and the use of new wetting agents. The sulphonated oil type of wetting agents, of which several kinds are now offered for sale, are particularly important. In the old days of soap, saponin, and calcium caseinate, it was particularly difficult to control diseases in which the fungus produces thick masses of hyphae and spores on the surface of leaf, stem, and fruit. The very nature of the growth resisted wetting by the fluids in use. The new wetting agents are so efficient that with ordinary care it is possible to wet completely even the most velvety pustule, and therefore carry the fungicide into the heart of the mass. Thus, powdery mildews

and diseases like leaf mould of the tomato have come under fairly easy control.

In addition to the sulphonated oils, which are in powder form, emulsified petroleums have come into extensive use as insecticides, and it has been found that when mixed with compounds of definite fungicidal value, they form a spray which persists on the foliage for some time. This is a relatively new development which may have a far-reaching effect.

Among the fungicides themselves a dispersed form of salicylanide is now employed against mildews and certain other diseases. combination with a suitable wetting agent it has proved very effective [6]. Other improvements are the manufacture of copper and sulphur fungicides in colloidal form.

There is little doubt but that the ideal method of disease prevention is the use of resistant varieties, and work on this subject is proceeding continually all over the world.

At Cheshunt an attempt is being made to obtain a variety of tomato resistant to leaf mould. For this purpose some 350 varieties have been tested. Of these 'Stirling Castle' and 'Up-to-Date' proved highly resistant, but the crop yield is low and fruit quality poor. After many years' work, certain types are available which have retained the original resistance of the parents, and in which the crop has greatly improved. These are not completely satisfactory, but there is little doubt but that a variety suitable for commercial work will be obtained ultimately.

In these lectures an attempt has been made to illustrate the manner in which the results of scientific investigations are being applied for the purpose of helping horticulturists to overcome diseases in plants. Each case, however, has its own peculiar difficulties, and it is not easy to give general information which will help everyone. Indeed, many problems can only be solved by investigation on the site. Horticulturists would be well advised, in every instance, to consult one of the competent authorities, rather than depend upon written information.

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Orobanche uniflora L. (Fig. 147).

By J. C. BENNETT.

According to some American ideas the family Orobanchaceae is divided into four genera, and the plant which is the subject of these notes is referred with four other species to the genus Thalesia. However, the generic name "Orobanche" is still the most commonly used even in America, and for that reason it is retained here.

The synonyms seem to point to uncertainty as to the proper classification of the plant:

Thalesia uniflora (L.) Britton (1894).

Orobanche uniflora L. (1753).

Anoplanthus uniflorus Endl. Icon. (1838).

Aphyllon uniflorum Torr. & Gray (1847).

Thalesia purpurea Heller (1897).

Aphyllon minutum Suksdorf (1900).

Aphyllon sedi Suksdorf.

Britton & Brown's description of this species is as follows:

"Thalesia uniflera (L.) Britton. Pale or naked broom-rape; one-flowered broom-rape; squaw-drops; cancer root. Stem usually less than I inch long, nearly subterranean, bearing several ovate-oblong scales and and I-4 slender erect scape-like glandular-puberulent naked I-flowered peduncles 3-8 inches high. Calyx campanulate, pubescent, glandular, 4-5 inches high, less than one-half the length of the corolla, its lobes as long as the tube or longer, lanceolate, acuminate; corolla white or violet, puberulent without, 8-I2 lines long, the curved tube about three times as long as the limb, the short lobes oval or obovate, obtuse; placentæ nearly equidistant; capsule ovoid, longer than the calyx."

In a footnote it is added: "Far western plants, formerly referred to this species, prove to be distinct," but there seems to be no confirmation of this statement beyond the fact that plants from Vancouver Island are very much smaller in all their parts than those from other localities in North America. The last two names shown above as synonyms may have some bearing on the subject as Mr. W. N. Suksdorf would be in a better position than other botanists to observe the size of the "far western plants" and their partiality for Sedum spathulifolium as a host. In addition to its size the eastern form of this Orobanche is said to have very different habits, about which I know little or nothing. These notes should, therefore, be considered to apply only to the small form from the Pacific coast.

Orobanche uniflora seems to occur throughout North America from Texas in the south, to Ontario in the north, a range which shows that

the plant would be hardy in any part of the British Isles. It is an annual root-parasite on Sedum spathulifolium and consequently is found in hot, dry positions—frequently reached by sea spray—in which this beautiful Sedum thrives and shows its best leaf colour variations. I have seen it on Lithophragma parviflora and L. tenella and once on a Saxifrage, but this is unusual. It is a pretty plant with violet and purple flowers which open just before their fertilization is likely to be interfered with by the taller cymes of the Sedum. An albino (fig. 147) with a pure white corolla and the rest of the plant pale yellow is very uncommon, and occurs generally in colonies by itself. Under cultivation this white form comes true from seed and is as easily managed as the type. Once only a pink variety was found, otherwise O. uniflora varies little.

In gardens this Orobanche is easily established by collecting its seeds and sowing them at once on any of the dwarf Sedums. seeds are exceedingly small so that it is important to wash them lightly to the roots of the host plant to prevent their loss by being blown away even in light winds. Of all the Sedums it seems to prefer S. acre as a host, and on this it develops greatly in size of flowers and number of individuals, to such an extent indeed that it is sometimes possible to count hundreds of plants on a patch of this Sedum a yard or so across.

In Nature the parasite seems to have very little weakening effect on the host, but under certain artificial conditions a struggle for supremacy takes place between the two plants over a period of years. The Orobanche weakens the Sedum until little is left on which it can live, and in consequence is itself reduced in numbers. The Sedum then quickly recovers, which gives an opportunity for the parasite to increase once more, and so on, perhaps indefinitely, without the extinction of either plant.

O. uniflora was first flowered at the Royal Botanic Gardens, Edinburgh, and it received a Botanical Certificate from the Royal Horticultural Society in 1926 when shown by Sir WILLIAM LAWRENCE. In both instances the seed was from the small western form.

There is a fascination, to me at least, in this form of gardening. and it would be interesting to know what other experiments have been made along these lines. The semi-parasitic Castilleja angustifolia has been established on grasses in a Scotch garden, and I have had moderate success with it in British Columbia. Kew has a very interesting collection of parasites, including several species of the European broomrapes. The saprophytes also, although probably more difficult to manage, would be interesting to try, especially such plants as Montotropa uniflora and the other species from the genera of the same family.

AWARDS MADE TO PLANTS IN 1934.

Androsace arachnoidea superba. A.M. May 8, 1934. From Messrs. Clarence Elliott, Stevenage. A very choice plant for the alpine house or scree, the rosettes of small leaves forming cushions which are surmounted by umbels of comparatively large, white flowers.

Antholyza intermedia. A.M. May I, 1934. From T. Hay, Esq., Hyde Park. A rare Iridaceous plant from South Africa. The spreading, linear leaves are about 9 inches long; the flowering stems bear up to 12 flowers each and attain a height of I foot. The flowers, which are disposed in two opposite rows, are bilabiate, the upper segment greatly exceeding the lower. The colour is bright scarlet. Probably not hardy.

Aquilegia longissima. A.M. May 29, 1934. From Messrs. Watkins & Simpson, Drury Lane, W.C. 2, and Messrs. Clarence Elliott, Stevenage. An attractive Columbine of distinct appearance. The flowers are of soft yellow with spurs over 3 inches long. Care may be necessary to maintain a true stock of this species, since Aquilegias hybridize readily.

*Aubrietia 'Barker's Double.' A.M. April 24, 1934. From Mr. E. J. Barker, Ipswich. Plant of compact habit; flowers partly semi-double, $\frac{9}{10}$ inch diameter, bright rich rosy red, very free flowering.

Brassolaeliocattleya \times 'Princess Shimadzu' var. 'June.' A.M. May 29, 1934. From Messrs. Black & Flory, Slough. ($C.\times$ 'Prince Shimadzu' \times $B.-l.-c.\times$ 'Caligula.') A pleasing flower in which the sepals and petals are bright mauve and the labellum rich purple.

*Calceolaria multiflora nana. A.M. April 24, 1934. From Messrs. Carter, Raynes Park. Plants of compact habit, 12 inches tall; flower trusses compact, forming a flattish head of flower; flowers 1½ inch by I inch of yellow, spotted red, bronze, scarlet and crimson shades. A very true and even stock in every way. Sown July 3, 1933.

Calochortus Kennedyi. A.M. June 12, 1934. From Lt.-Col. C. H. Grey, Hocker Edge Gardens, Cranbrook. A very beautiful Californian plant requiring a warm, sunny place in well-drained sandy soil. It sends up several linear leaves and large, rounded flowers of brilliant vermilion colour.

Camellia 'Adolphe Audusson.' A.M. May 1, 1934. From Sir John F. Ramsden, Bt., Gerrards Cross. A variety with large, full flowers of rosy-salmon colouring, somewhat paler at the margins of the petals.

Campanula Andrewsii. A.M. May 29, 1934. From F. J. Hanbury, Esq., East Grinstead. A Greek species, forming a basal cluster of oblong-spathulate, toothed leaves, from among which arise sprays of tubular, light blue bells. It is variable in the degree of hairiness of the foliage, and is often monocarpic.

^{*} After trial at Wisley.

Campanula Elatines. A.M. June 12, 1934. From Dr. P. L. Giuseppi, Felixstowe. An attractive species for the rock garden. The sprays of star-shaped, lavender-blue flowers are freely produced and almost cover the basal rosettes of downy, Ivy-like leaves. It closely resembles the more familiar C. garganica. (See p. 366.)

Ceanothus eyaneus. A.M. June 12, 1934. From the Director, Royal Botanic Gardens, Kew. A graceful Californian species from an altitude of 1,500 feet, which appreciates the shelter of a wall. The small, oval leaves are toothed and bright green, the light blue flowers abundantly produced and gracefully carried in long panicles at the ends of lateral branchlets.

Clematis indivisa lobata, Stead's Variety. F.C.C. May 1, 1934. From Lord Aberconway, Bodnant. A most handsome climbing shrub, free-flowering but tender. The leaves are opposite and ternate with lobed leaflets. The flowers have 6 or more narrow white petals and a central cluster of pale yellow stamens tipped with rosy-purple anthers, and are well carried in long, spreading, axillary panicles. (Fig. 148.)

Corokia Cotoneaster. A.M. May 29, 1934. From Lord Aberconway, Bodnant. An evergreen shrub with rigid, tortuous branchlets bearing small, orbicular-ovate leaves, bronzy-green above and white-tomentose beneath. The small, yellow, axillary flowers are succeeded by ellipsoid red fruits. An interesting shrub of slow growth, suitable for the rock garden.

Crataegus 'Cheal's Crimson.' A.M. May 29, 1934. From Messrs. J. Cheal, Crawley. This double-flowered Thorn received the Society's Preliminary Commendation on May 23, 1933. It has showy scarlet-crimson flowers, and is one of the most ornamental varieties of Crataegus Oxyacantha.

Cymbidium × 'Dora' var. 'Regina.' A.M. May 29, 1934. From Messrs. H. G. Alexander, Tetbury. ('Wheatear' × 'Bullfinch.') Flowers of bright yellowish green colour, apex of labellum soft red.

Cymbidium × 'Mandarin,' Westonbirt var. A.M. May 29, 1934. From Messrs. H. G. Alexander, Tetbury. ('Wheatear' × 'Miranda.') Large flowers of golden-green colour, apex of the labellum red-brown.

Dendrobium Sanderae viridissimum. F.C.C. May 29, 1934. From H. P. Lawson, Esq., Lynbrook, Woking. A comparatively large flower, 4 inches in width, white, except for rich green on the side lobes and the base of the labellum.

Doryanthes Guilfoylei. A.M. May 8, 1934. From Lord Rothschild, Tring Park, Tring. A magnificent Amaryllid which was discovered in North Queensland and flowered for the first time in cultivation at Melbourne Botanic Garden in 1893. The habit resembles that of Yucca, with massive, rich green, fibrous leaves and an elongated terminal inflorescence. The individual flower is about 4 inches long, bright crimson, shading to orange at the centre. (Fig. 149.)

Fabiana imbricata. A.M. June 12, 1934. From Lord Horder, Ashford Chace. A Heath-like shrub introduced from Chile nearly a

century ago. Planted at the foot of a warm wall it develops long tapering growths covered with tiny, subulate leaves. The very numerous, tubular, white flowers appear at the tips of short, lateral twigs.

Geum 'Prince of Orange.' A.M. May 29, 1934. From Messrs. Watkins & Simpson, London. A very free-flowering hardy border plant about 2 feet tall. The flowers are semi-double, deep orange, and measure $2\frac{1}{2}$ inches across.

Homeria aurantiaea. A.M. May 28, 1934. From Collingwood Ingram, Esq., Benenden. The South African genus Homeria is closely allied to Moraea, and has long, linear leaves and somewhat fugaceous flowers. In the present plant, the perianth-segments are lanceolate and more or less recurved, orange paling to yellow at the base. The filaments are united to form a tube enclosing the style.

Iris Boissieri. A.M. June 12, 1934. From Collingwood Ingram, Esq., Benenden. A small Iris of the Xiphion Section, but differing from its nearest allies in the possession of a rudimentary beard on the inner surfaces of the outer perianth segments. It is a native of Portugal, and forms a small bulb from which arise a few narrow leaves a foot long, and a slender stem bearing a solitary purple flower.

Laeliocattleya \times 'Alma,' Old Dog Kennel var. A.M. May 29, 1934. From M. L. Wells, Esq., Chiddingfold, Surrey. (L-c. \times 'Helius' \times L-c. \times 'Appam.') A charming variety with flowers of golden-salmon colour, the labellum soft crimson.

Linum salsoloides nanum. A.M. June 12, 1934. From Dr. P. L. Giuseppi, Felixstowe. A very choice alpine plant, forming a mat of little fine-leaved shoots which produce a succession of erect, widely-expanded flowers with white petals of satiny texture.

Meconopsis quintuplinervia. A.M. May 1, 1934. From T. Hay, Esq., Hyde Park. A beautiful species discovered in Kansu in 1880 and introduced to cultivation by Reginald Farrer in 1915. It is a good perennial, similar in habit to the Iceland Poppy, with tufts of hairy, oblanceolate, pale green leaves. The flowers are borne singly on tall, slender stalks. The petals are lavender-blue, the stamens creamy-white.

Miltonia × pulchra, Orchidhurst var. F.C.C. May 24, 1934. From Messrs. Armstrong & Brown, Tunbridge Wells. ('Lycaena' × 'Wm. Pitt.') An elegant form with large flowers of rich ruby-crimson colour.

Miltonia × 'Sheila,' Brockhurst var. A.M. May 29, 1934. From F. J. Hanbury, Esq., East Grinstead. ('Beau Brummell' × 'Wm. Pitt.') An elegant variety with crimson flowers.

Odontioda × 'Columbia' var. 'Electra.' A.M. May 29, 1934. From Messrs. Charlesworth, Haywards Heath. (Odontioda × 'Alcantara' × Odontoglossum × 'St. James.') Flowers bright red, of medium size.

Odontoglossum × 'Imperator' var. 'Rex.' A.M. May 29, 1934. From Messrs. Charlesworth, Haywards Heath. ('Britannia' × 'The Czar.') The spike bore eleven large magenta-purple flowers.

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Odontonia × 'Olga' maculata. A.M. May 29, 1934. From Messrs. Charlesworth, Haywards Heath. (Odontoglossum crispum × Odontonia × 'Thisbe.') The large white flowers are slightly spotted with rose.

Odontonia × 'Tyana,' Ynshir var. A.M. May 29, 1934. From Messrs. Mansell & Hatcher, Rawdon, Leeds. (Odontonia × 'Nesta' × Odontoglossum × 'St. James.') A flat flower in which the segments are mainly rose-purple with reddish shading.

Paeonia Delavayi. A.M. May 8, 1934. From F. C. Stern, Esq., Goring-by-Sea. An erect-growing subshrub 4 to 5 feet high, with large, bipinnatifid leaves nearly a foot long. The divisions of the leaf are lanceolate, entire or with a few teeth. Each growth bears one terminal and several lateral flowers which are dark crimson and about 3 inches in diameter.

Paeonia 'Hakugan.' F.C.C. May 29, 1934. From G. W. E. Loder, Esq., Ardingly. A very beautiful Tree Pæony with large flowers made of up many satiny-white, crimped and toothed obovate petals.

Paulownia imperialis. A.M. May 29, 1934. From Lord Horder, Ashford Chace, and F. J. Hanbury, Esq., East Grinstead. A Chinese tree introduced a century ago and not uncommon in the warmer parts of the country. The softly hairy, broadly ovate leaves are a foot or more long, and the large, blue-purple, foxglove-like flowers, which appear just before the foliage, are borne in massive terminal panicles.

Pleione yunnanensis. F.C.C. May 9, 1934. From Colonel Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath. A charming species with rich purple flowers, borne on 6-inch stems. The labellum has a fringed margin and is spotted with red. A pan containing twenty-two flowering plants was staged.

Primula Wigramiana. A.M. May I, 1934. From T. Hay, Esq., Hyde Park. An attractive new species of the Soldanelloid Section, from Nepal. The plants form a rosette of spathulate, softly hairy leaves with recurved margins. The flowers are arranged in dense spikes of 6 or 8 at the ends of erect, mealy stems 6 inches high. The semi-pendulous flower is funnel-shaped with a serrate margin, creamy- or bluish-white, and fragrant.

Prunus serrulata 'Okiku Zakura.' A.M. May 1, 1934. From Collingwood Ingram, Esq., Benenden. A striking Japanese Cherry with loosely arranged clusters of very large, double, blush-pink flowers. The margins of the petals are finely and evenly serrate.

Rhododendron \times 'Albatross.' A.M. June 12, 1934. From Lionel de Rothschild, Esq. (R. discolor \times R. \times Loderi 'Venus.') Leaves large obovate, nearly 9 inches long, glabrous beneath. Trusses 12-flowered, 8 to 11 inches across, flowers wide-open, delicate pink, slightly yellow-spotted in the throat, about $4\frac{1}{2}$ inches at the mouth. Corolla lobes elegantly crinkled, anthers pale yellow, ovary and style glandular.

Rhododendron (Azalea) 'Gumpo.' A.M. June 26, 1934. From Mr. G. Reuthe and C. Ingram, Esq. A low-growing Japanese Azalea

Fig. 147.—Ововансне unifiora—White Variety. (р. 397)

To face 1. 402.

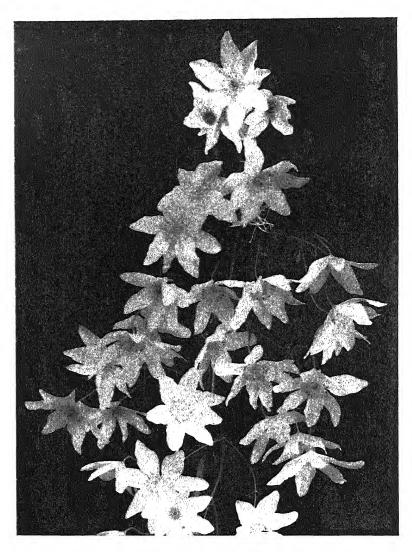


Fig. 148.—Clematis indivisa lobata, Stead's var. $(p.\ 400)$



Fig. 149.—Doryanthes Guilfoylei (p. 400)

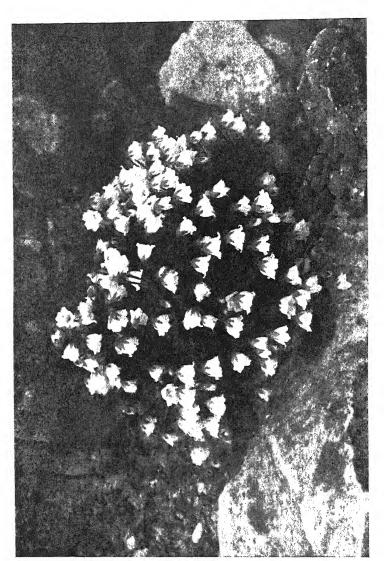


Fig. 150.—Phyllodoce nipponica. (p. 408)

with short bristly shoots, small obovate leaves and large white flowers slightly yellow-marked in the throat, about an inch across, with undulate spreading lobes.

Rhododendron argyrophyllum. A.M. May 1, 1934. From G. W. E. Loder, Wakehurst Place, Ardingly, Sussex. A large shrub with leaves 4-5 inches long and an inch wide, white below, and umbels of 6-10 white flowers flushed rose and spotted deeper pink in the upper part within.

Rhododendron × 'Benito.' A.M. June 12, 1934. From Lionel de Rothschild, Esq. ($R.\ discolor \times$ seedling of $R. \times Luscombei$.) Leaves oblong, glabrous beneath, often cordate at base, about 6 inches long and $2\frac{1}{2}$ inches broad; the large wide-open flowers are about 5 inches across, pink in bud but white delicately pink-flushed when open, with mingled brown and rose markings on the upper side of the throat, borne in trusses of about fifteen on partially glandular pedicels about $1\frac{1}{2}$ inch long. Anthers light brown; ovary and style glandular.

Rhododendron × 'Bibiani.' A.M. May I, 1934. From L. de Rothschild, Esq., Exbury. An upright, fairly compact shrub with bright scarlet flowers with a few maroon spots. The truss is upright, compact, and has 12 to 14 flowers.

Rhododendron caloxanthum, orange form. A.M. May 1, 1934. From L. de Rothschild, Esq. Only three plants of this form were raised from seed of Farrer's collecting. They differed from the type in having more oblong and less orbicular leaves and in being more persistently hairy on the stem, as well as in the colouring. The buds are pink and open to a deep yellow suffused with red.

Rhododendron × 'Cunningham's Sulphur,' White's var. A.M. May 1, 1934. From Mr. H. White, Sunningdale, Surrey. A fine form raised from seed of the hybrid 'Cunningham's Sulphur,' the origin of which is unknown. Flowers yellow.

Rhododendron \times 'Fabia.' A.M. June 12, 1934. From Lord Aberconway, Bodnant, N. Wales. (R. Griersonianum \times R. dicroanthum.) Leaves small, acuminate, oblong-elliptic, dark green above, at first covered beneath with close grey tomentum, later glabrescent, to $3\frac{1}{2}$ inches long, $1\frac{1}{4}$ inch broad; the horizontal or declining, bright scarlet, bell-shaped flowers are about 2 inches long and $2\frac{1}{2}$ inches across and form a loose 8-flowered truss about $6\frac{1}{2}$ inches across; pedicels arching, $1\frac{1}{2}$ to 2 inches long; calyx red, filaments red, pubescent at base; anthers black; style red; ovary tomentose.

Rhododendron scintillans. F.C.C. May 1, 1934. From L. de Rothschild, Esq. A small shrub belonging to the Lapponicum Series with narrow scaly leaves about $\frac{1}{2}$ inch in length, densely covered with lavender-blue flowers in trusses of three at the tips of the shoots. Native of Yunnan.

Rhododendron \times 'Snow Queen.' A.M. May 1, 1934. From the Knaphill Nursery Co., Woking. ($R. \times Halopeanum \times R. \times Loderi.$) Raised by Sir Edmund Loder. A shrub of stiff, upright habit, flowering at the end of May or early June. Flowers bell-shaped

in a well-built truss, buds pale pink opening white with small ruby markings in the throats. Pedicel and calyx rosy-crimson.

Rosa Lawranceana 'Oakington Ruby.' A.M. May 8, 1934. From Messrs. C. H. Bloom, Oakington, Cambs. A dwarf shrub, barely a foot in height, with semi-double, ruby-red flowers an inch or so across. Rosa Lawranceana is the name given by Sweet to a dwarf variety of the China Rose in honour of Miss Lawrance, a celebrated painter of flowers.

Rose 'Climbing Cherry.' A.M. June 26, 1934. From Messrs. Savage, Barkingside. A strongly scented climbing Hybrid Tea variety of fine form and good substance. The outside of the petals is light yellow and the inside bright rose.

Rose 'Mrs. Elizabeth Lee.' A.M. June 19, 1934. From Messrs. Chaplin, Waltham Cross. A sweetly scented, crimson Hybrid Tea variety of good form. The outer petals sometimes have a slight green central streak.

Rose 'Phyllis Gold.' A.M. July 10, 1934. From Mr. H. Robinson, Hinckley. An excellent Hybrid Tea variety which is considered to be the best of its colour yet introduced. It was raised by the exhibitor as the result of a cross between the varieties 'Lady Florence Stronge' and 'Julien Potin.' It is very free flowering and blooms are produced over a long season. The well-shaped flowers are large and of good substance, lemon-chrome, becoming lighter towards the edges of the petals.

Saxifraga 'Kathleen Pinsent.' A.M. May 29, 1934. From Messrs. Clarence Elliott, Stevenage. A pretty hybrid with small rosettes of lightly encrusted leaves and spreading panicles of medium-sized, rosy-pink flowers.

Scabiosa macedonica lyriophylla. A.M. June 26, 1934. From Mr. Ernest Ladhams, Elstead. A free-flowering herbaceous plant bearing medium-sized flowers of deep crimson shaded with maroon.

Sophrolaeliocattleya × 'Cibola,' Prinsep's var. A.M. June 19, 1934. From N. Prinsep, Esq., The Boxes, Pevensey Bay, Sussex. (C. × 'Tityus' × S.-l.-c. × 'Edna.') A compact flower of medium size, the sepals and petals purple-rose, the round labellum ruby-crimson with a golden throat.

Spiraea Henryi. A.M. June 12, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A deciduous Chinese shrub reaching a height of 10 feet. The spreading branches are clothed with rounded, toothed leaves 2 to 3 inches long. The small, white flowers are arranged in corymbs 2 inches across. Introduced from China in 1900.

Statice 'Coeleste.' F.C.C. June 12, 1934. From Messrs. L. R. Russell, Richmond. This variety received A.M. on August 15, 1933. and is one of the finest for greenhouse decoration. It produces a succession of large, spreading panicles of bright lavender-blue flowers above a basal cluster of ample deep green leaves.

Stewartia malachodendron. F.C.C. June 26, 1934. From the Knaphill Nursery Co., Woking. A handsome deciduous shrub from the South-Eastern United States, reaching a height of about 12 feet. The leaves are elliptic, finely toothed and downy, 3 to 4 inches long. The attractive flowers are 4 inches across, with 5 obovate, creamy-white, spreading petals and a central cluster of purplish stamens.

Telopea truncata. A.M. May 29, 1934. From the Hon. Mrs. Sebag Montefiore, Plymouth. A handsome, tender shrub from Tasmania, somewhat resembling the Australian Waratah, T. speciosissima. The present plant has lanceolate-spathulate leaves of leathery texture and flattish heads of rich scarlet flowers.

Trachelospermum jasminoides. A.M. July 10, 1934. From Mrs. W. J. Whittall, Haslemere. A twining, evergreen shrub from China, formerly widely grown in greenhouses, but quite amenable outside if given the shelter of a wall. It has lanceolate leaves of lustrous green, and compact cymes of fragrant white flowers, the petals of which are curiously twisted.

Verbena tridens. A.M. June 12, 1934. From Messrs. Clarence Elliott, Stevenage. A small, Heath-like Patagonian shrub with stiff branches closely set with narrowly 3-lobed leaves. The small, white flowers are scented and appear in clusters at the ends of short lateral growths.

Viola pedata bicolor. A.M. May 1, 1934. From Lt.-Col. C. H. Grey, Hocker Edge Gardens, Cranbrook. The North American Viola pedata is represented in British gardens by several varieties, of which the present plant is perhaps one of the finest. The flowers are large, the two upper, recurved petals deep violet and velvety in appearance, the lower three pale lilac, rayed with purple and marked with orange at the base. The leaf is divided into 5 or 7 narrow, lobed segments.

Zenobia speciosa pulverulenta. F.C.C. June 19, 1934. From the Knaphill Nursery Co., Woking. This valuable shrub received A.M. on June 21, 1932, and is described in the JOURNAL, vol. 58, p. 33.

THE AWARD OF GARDEN MERIT.-XXVI.*

By F. J. CHITTENDEN, F.L.S., V.M.H.

183. Rose Fellenberg.

Award of Garden Merit, October 7, 1929.

This is an old Rose, for it was raised in 1857, and as a shrubbery Rose it is still unsurpassed in its colour. It is a vigorous and hardy shrub, and is best when allowed to scramble over other bushes. Like other Roses with Noisette blood it requires little or no pruning—indeed, it resents it—and if left to itself will bloom over many months, and is particularly good in autumn. The rosy-crimson flowers are of moderate size in clusters.

Possibly the coming of the formal Rose bed has lessened the desire for Roses of older type, possibly the desire for novelty has pushed the older Roses into the background, so that it is in a sense novel to see a garden where the Roses of a century or so ago are cherished. Yet they have their place, provided they are treated as they should be, and most of them call for nothing special in the way of soil.

The Noisettes with their pleasant perfume and their clustered flowers are almost lost. 'Maréchal Niel,' one of the loveliest Roses when well grown that were ever raised, is scarcely ever seen. The vigorous 'Aimée Vibert,' raised in 1928, with pure white flowers, an admirable companion for Fellenberg, is still seen with fair frequency, but 'Lamarque,' 'L'Idéale,' 'Celine Forestier' and 'Cloth of Gold'—where are they?

184. Tulipa Eichleri.

Award of Garden Merit, June 20, 1932.

The Tulips known to the great majority of gardeners are those grown for bedding or for cutting. These are for the most part varieties that have been raised in gardens, but there are a number of wild Tulips worth far more attention than they receive at present. Some of them are very dainty in habit and colouring, some are extremely striking and brilliant, and among the latter the great red flowers of *Tulipa Eichleri* are pre-eminent.

- T. Eichleri is native of the Transcaucasian region, whence it was introduced about sixty years ago, and described and pictured by
- * The notes on the first hundred plants to receive the Award of Garden Merit have been collected from our JOURNAL, vols. 47 to 53, and published as a pamphlet, price is. For subsequent notes see vol. 54, pp. 218 and 423; 55, pp. 121 and 276; 56, pp. 80 and 245; 57, pp. 65 and 354; 58, pp. 171 and 400; and 59, pp. 131, 308, and 360.

Dr. Regel in Gartenflora, 1874, p. 193, t. 799. It is related to T. Greigii, but that species has usually shorter stems, its perianth pieces are rounded at the apex with a sharp point, and its leaves are usually blotched or striped with brown. In T. Eichleri the erect stem, leafy for about half its length, is about 18 inches long and is densely covered with short hairs, the leaves are rather narrow, pointed, grey-green, as long as the stem, and covered on the upper side with short hairs. The flowers open wide, and each perianth piece of which at least the inner ones are acute, is marked at the base by a rhomboidal black blotch margined with yellow. T. Eichleri flowers in April.

Like nearly all the Tulips, this is best planted in the first half of November in deeply dug well-drained soil in a sunny spot, left, after flowering, until the leaves die down naturally in June or July, then lifted and kept in a warm dry shed until planting time again.

185. ERICA ARBOREA ALPINA.

Award of Garden Merit, June 19, 1933.

This heath needs a lime-free soil, and sandy peat or sand and leaf soil suit it well. Given that, although a native of Spain, albeit one that grows only at an altitude of over 4,500 feet, it is a heath to be depended upon, less valuable for its flowers than for the cheerful vivid green which it shows in summer and winter alike. It has withstood very trying winters at Wisley without the slightest damage, and all know that the Wisley heath-garden is exposed to all winds and weathers.

It forms a dense and sturdy bush, upright in growth and stiffer than *E. arborea*. Its flowers are small in stiff panicles a foot long and of a dull white. They are not very abundant until the plant is rather old, but that does not matter, for it is for its evergreen foliage and excellent habit that *E. arborea alpina* is worth growing, and how good these are is evident from it being numbered among the best hardy heaths.

It flowers in March and April and grows eventually to a height of 6 or 8 feet, though it takes some time to attain that size.

GARDEN NOTES.

Phyllodoce nipponica (fig. 150) is a charming little Ericaceous plant from Japan, slow in growth, but of comparatively easy culture. It attains a height of about 6 inches, and is one of the most dainty subjects for a selected spot on the rock garden. Of tufted habit, the shiny dark green linear leaves are closely set on woody little branches which gives the plant, out of bloom, the appearance of Daphne rupestris. The exquisite white bell-shaped flowers, very faintly flushed pink on the lobes, are produced singly on slender erect little stems during the first week in May and continue throughout the month. It does not appear to be extremely particular as to situation, but a position on the north side of a rock in a peaty loam compost suits it admirably. Cuttings taken in August and inserted in a sandy peat mixture root fairly readily, especially if a little bottom heat can be given, or it can be raised from seed sown in spring. Propagation by either method is slow. A more exquisite little plant for the rock garden cannot be conceived, and he who is willing to be patient is amply rewarded. Phyllodoce nipponica is figured in the Bot. Mag. t. 8405 as P. amabilis Stapf.—Ben Wells, Merstham.

Terete-leaved Phalaenopsis.—Phalaenopsis (Moth Orchids) are usually associated with long spikes of large showy flowers, and broad, fairly large, glossy green, or mottled leaves. True a number have short spikes and comparatively small blooms, variation being as prevalent in this as in other Orchid genera, but within recent months two species have been exhibited with such distinctive foliage (resembling that of some Scuticaria), while the flowers are grouped on short erect peduncles, that the limits of the genus must evidently be

Both species are natives of West Borneo, and are said to grow in proximity on wet moss-covered rocks. Both have been named by Dr. J. J. SMITH, and have been figured in the Orchid Review, 1933: P. Denevei on pp. 75, 76, and P. serpentilingua p. 171, and (lip only), p. 148.

Though easily distinguished when in flower (in P. Denevei the front lobe of the lip is truncate, while in the other species the corresponding part is aptly described by the specific name), the foliage is so similar that in Messrs. Sanders' nursery two imported pieces were potted together under the impression they were the same species. Similarity in conditions has no doubt induced the close resemblance.

Terete foliage usually indicates resistance to heavy rains, or strong sunlight, perhaps both. Such foliage is often pendent, but these Phalaenopses seem to follow Scuticaria Hadwenii and keep the leaves erect. Plants attached to wood blocks, did not succeed, and had to be reversed.

So far both species seem to thrive and flower freely if placed in small pans and given the treatment accorded *P. Schilleriana*, *P. Sanderiana* etc. Seed pods have already been obtained between them and the better known species, proving their affinity.—*E. Cooper*.

Deutzia Monbeigii (fig. 151).—The genus Deutzia has many representatives under cultivation in gardens, and among them Deutzia Monbeigii, when seen in good condition, forms an attractive plant conspicuous for its wealth of flowers. Individually small, together they form a mass of white when the plant is in full bloom.

The figure shows one of several at Wisley which have now attained the height of 6 feet or more, the branches spreading to an almost equal width. The habit is rather erect, but when in bloom the branches are bent down by the weight of flowers to give the effect of an almost pendent habit.

The foliage is somewhat scanty, the leaves are small, about $\frac{1}{2}$ inch or slightly more in length, and about half as wide, green on the upper surface and white beneath, where they are covered with white starshaped hairs. Flowers are produced in axillary cymes of from 5 to 12 flowers according to their position on the stems, those placed farthest from the apex of the shoots bearing the largest number. When in flower few plants give a better display.

In describing this plant in Notes from the Royal Botanic Garden, Edinburgh, vol. 11, p. 205, Sir W. W. Smith places it in affinity to D. staminea Br. It was introduced by Forrest from Yunnan and collected by him at an altitude of 8,000 to 10,000 feet in open scrub. E. E. Maire had in 1912 collected specimens in N. W. Yunnan, while Schneider had found it in 1929 in S. Szechwan.

The plants at Wisley were raised from Forrest's seed collected in 1917-9 and planted some years ago, and have thus withstood the low temperatures experienced in 1929. Like others of this genus it delights in sunshine, and in all probability the last two hot seasons are responsible for its floriferousness during 1934.

Schima argentea (fig. 152).—This species of Schima is apparently quite hardy at Wisley, though seldom seen growing out of doors in gardens. It has, however, been badly damaged in winter in gardens in milder districts. For some years the plant has been in cultivation at Wisley, and is now about 7 feet in height and breadth. For the past two seasons it has flowered and attracted considerable attention. It is an evergreen like other species of the genus, and bears some resemblance in its flowers to Gordonia, to which it is closely allied.

It is of erect habit and has rather thick shining foliage, light green on the upper surface and glaucous beneath. The flowers are borne singly in the axils of the leaves and clustered at the apex of the current year's shoots. The flowers are creamy-white and bear many stamens adnate to the incurved fleshy petals.

The majority of the members of this small Asiatic genus are either tropical or sub-tropical plants, and *S. argentea* is probably its hardiest representative. It belongs to the order Ternstroemiaceae. Forrest collected this plant in China on his expedition of 1917–1919.

It is interesting to note that the flowers of 1933 were fertilized, and the flattened globular fruits are swelling and have every appearance of producing seed this year. So far as can be seen, the plant requires no very special attention in regard to soil. Here it is growing in an ordinary garden soil where the subsoil is of gravel fully exposed to the south and slightly shaded and sheltered from the west.

Sanicula alpina.—A reference in Mr. James Douglas' article on "Auriculas" in the July issue of the R.H.S. JOURNAL calls up memories of holidays spent on Monte Baldo. The peasants of that neighbourhood still speak of *Primula Auricula* and *P. spectabilis* as the yellow and red 'Sannicolas.'*

The herbalists of the sixteenth century were more concerned with the therapeutic virtues of a plant than botanical niceties, and labelled many a species a Sanicle which had no resemblance to others of the name further than its healing power. In those stirring times, men lived by, and from the sword. A Sanicle was a plant which restored, not a member of the Umbelliferae. Gerard inclined to the belief that Matthioli described his Sanicula alpina from P. Auricula, and is disposed to ridicule the idea that the Italian physician had ever seen a "bright shining red beares eare." His doubt would have perhaps been dissipated had he known that natural habitats of P. Auricula and P. spectabilis could be found on the same mountain. More than three hundred years have come and gone since Matthioli laid down to his last sleep, but his countrymen, careless of the mutations of nomenclature, remain faithful to 'Sannicola,' and judge 'Primula' but a word of the stranger.—Fred Stoker.

[Gerard (Herbal, p. 641 (1597)) wrote: "The bright shining Red Beares eare of Mathiolus description seemeth to late Herbalists to be rather a figure made by Conceit or imagination, than by the sight of the plant it selfe, for doubtlesse we are perswaded that there is no plant, but only a figure foisted for ostentations sake, the description whereof we leave to a further consideration bicause we have not seene any such plant, neither do we believe there is any such." But in his edition of 1633 Johnson adds: "Our author is here without cause injurious to Matthiolus; for he figures and describes onely the common first described yellow Beares eare: yet if he had said the flowers were of a light shining red, he had not erred; for I have seen these flowers of all the reds both bright and darke that one may imagine."—Ed.]

As pronounced.

Fig. 151.—Duutzia Monbeigh at Wisley. (To face p. 410. (p. 409)

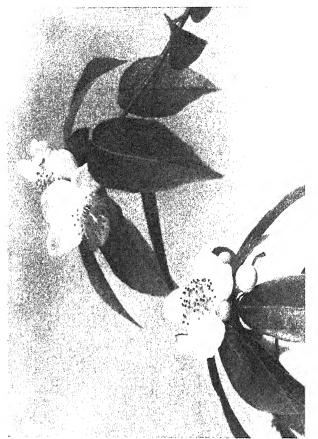


Fig. 152.—Schima argentea. (p. 409)

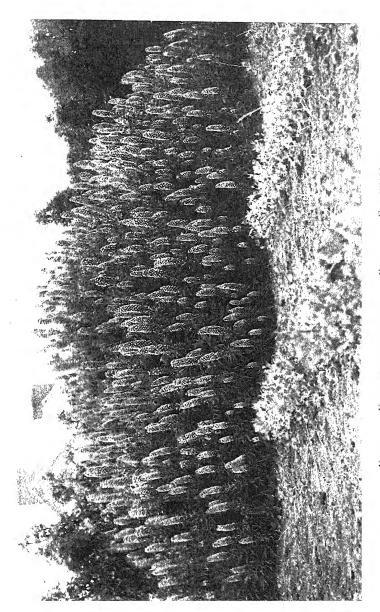


Fig. 153. -- Echium Callthyrsum at Coverack, Cornwall.

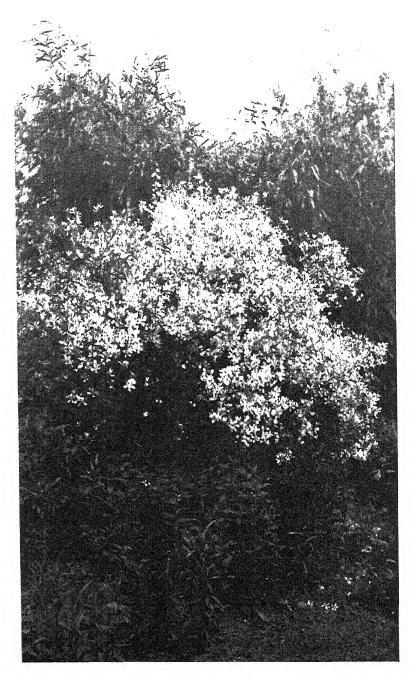


Fig. 154.—Aegle Sepiaria.

[To face p. 411.

Echium callithyrsum.—The plant illustrated (fig. 153) is growing in Mr. A. F. CALVERT'S garden at Coverack, a village on the east side of the Lizard Peninsula, Cornwall, in the open and unprotected. It flowers there in May. It is 20 feet across and 10 feet high and this year bore over six hundred spikes of the beautiful bluish-violet flowers.

E. callithyrsum is native at Cumbre de Tenteriguada in the Canary Islands in rocky places at an elevation of about 5,000 feet above sea level. There also it flowers in May.

Aegle Sepiaria.—By the kindness of Mrs. Shelley we are able to illustrate (fig. 154) a fine plant of this hardy orange as it grows in her garden at Hitherbury, Portsmouth Road, Guildford. The photograph was taken in May 1934 when the white flowers were being produced in profusion. It is not a very uncommon shrub, but its beauty in flower and its remarkable appearance for the great part of the year when the long strong thorns that make it such a formidable hedge plant in some parts of southern France are not hidden by the flowers, give it a claim to be more commonly planted than it is. In favourable years the small yellow intensely bitter oranges are produced in some numbers in the autumn and give another reason for its presence in the gardens of the "curious." It is hardy in any place with a winter climate no more severe than that of Wisley, and there are therefore few places in England where it cannot be grown.

BOOK REVIEWS.

"School Botany." By Dr. M. Skene. Ed. 2. 8vo. vii + 278 pp. (Clarendon Press, Oxford, 1934.) 3s. 6d.

We noticed this excellent text-book very favourably when it first appeared

in 1930 and are glad to see a second edition so soon called for.

Opportunity has been taken to make necessary corrections in the text and to add two chapters which increase the usefulness of the book and incidentally enlarge it by about thirty pages.

"Aristocrats of the Flower Border." By G. A. Phillips. 8vo. x+234 pp. (Country Life, London, 1934.) 8s. 6d. net.

This book is in the main a book on perennial herbaceous plants and bulbous plants suitable for the herbaceous border. It is not, nor does it pretend to be, a complete account of the plants suitable for borders, for there is, for instance, no mention of Gladioli, although Lilies come in for fourteen pages of description, and of course annuals are not admitted except in the first year of the border's life. It is less easy to understand why border Chrysanthemums find no place. The selection of plants and varieties appears to be well done, though not exhaustive of even the best, and including perhaps some that scarcely merit the title of "aristocrats."

We could wish that some warnings had been included, such as one against planting Kniphofias, Aster Amellus, Delphiniums and some other perennials in autumn, for rarely do they take kindly to disturbance then. Another warning might be given as to the difficulty commonly found in transplanting established plants of herbaceous Clematis and Gentiana lutea, and of the time necessary in re-establishing Hemerocallis; they are not quite so bad as Pæonies, but still they take some time to "settle in" and are best left undisturbed for some years.

"Gardeners' Handbook." By L. H. Bailey. 8vo. 292 pp. (Macmillan, New York, 1934.) 12s. 6d.

This book contains "Brief indications for the growing of common flowers, vegetables and fruits in the garden and about the home." The names of genera are arranged alphabetically and of the principal species also alphabetically under the genus, then follow general notes of each genus, the necessary cultivation called for, propagation and so on, with brief particulars of height, habit and colour of the species mentioned. There are a good number of pleasant woodcut illustrations which show the habit of many species. Brief articles on such subjects as potting, glass structures, perennials are interpolated and the book certainly provides what its sub-title claims for it.

It is, of course, intended for American readers, and some plants common and indispensable in English gardens are not mentioned.

"Plant Parasitic Nematodes." By T. Goodey. 8vo. xx + 306 pp. (Methuen, London, 1933.) 21s. net.

The relative importance of eelworms as pests of plants is being realized more and more by the agriculturist and horticulturist, and for them as well as for the plant pathologist, botanist, and advisory officer this book will prove invaluable. The author has made the Nematodes his special study for many years, and has gathered within the compass of a single volume all the available data concerning the eelworm pests of plants, and has in addition provided valuable information regarding the many doubtful partly parasitic, free-living and predatory species.

The title may arouse doubts in the minds of some horticulturists that this volume is intended primarily for the use of helminthologists and plant pathologists. A perusal of the paragraph headings under which each species of eelworm is considered may even confirm this opinion, for he will note the headings: "Synonyms," "Historical," "Morphology," "Pathology," and "Geographical Distribution" which, though of interest to the technical worker, are subjects of little practical importance to the plantsman. He will, however, appreciate the inclusion in this work of the "Symptoms of Attack," "Life History," "Spread in Soil," "Hosts" and "Control," together with certain other phases, e.g. "Passage through Animals," and "Ports of Entry into the Host."

The average agriculturist and horticulturist has not yet undergone any training in the study of these micro-organisms, though some are known to consider themselves competent to differentiate between the parasitic, semi-parasitic and saprophytic forms of eelworms found in diseased plant material. But the author shows that casual examination of eelworms by means of a low-powered microscope is quite insufficient to enable the species to be determined, as is also the determination of the causal organism by means of the signs of attack. One example will suffice—the occurrence of concentric brown rings in eelworminfected Narcissus bulbs has been considered to be diagnostic of the presence of the stem eelworm, Anguillulina dipsaci, though four other species of Nematodes, viz. Aphelenchoides fragariae, A. parietinus, Aphelenchus avenae and even the free-living Cephalobus striatus, are capable of producing similar symptoms in these bulbs (p. 78).

There are nine chapters, of which six are devoted to a review of the several parasitic forms—viz. Species of Anguillulina causing Galls on Shoot Structures (Chap. II); Species of Anguillulina parasitic on Shoot Structures (Chap. III); Root Parasites (Chaps. IV, V and VI); and Species of Aphelenchoides (Chap. VII).

Chapter I is concerned with a general survey of the Nematoda—the morphology, the technique employed, the measurements and proportions of eelworms, and the systematics of the class.

The penultimate chapter describes the species of eelworms which are other than obligate parasites under the sub-headings: (I) Parasites and Semi-Parasites of doubtful pathogenicity; (II) Saprophytes; and (III) Predators.

A valuable list of references to papers is given at the conclusion of each

The final chapter is entitled "Biologic Races in Plant-Parasitic Nematodes" and, while this subject is of considerable academic interest, its practical importance to the agriculturist and horticulturist is vast. Data are presented showing the existence of biologic races or strains in two species of eelwormsviz. the Stem Eelworm, Anguillulina dipsaci, and the Root-Knot Eelworm, Heterodera marioni. The fact that specialized and unspecialized races of these two species occur should be appreciated by every grower who, armed with the knowledge of the crop history of the land under his cultivation, will thereby be able to avert infection by avoiding certain crops on land in which an unspecialized race of eelworm is known to be present. The danger arising from the presence in the soil of an unspecialized race is that many crops act as hosts, and judicious rotation will tend to reduce the danger to a negligible quantity. The host plants in the case of these two well-known species provide a formidable list with 119 species belonging to 40 Natural Orders, and 618 species belonging to 109 Natural Orders, respectively

The book is well illustrated, the greater number of figures showing the general structure of all the more important species described, and other figures illustrate

the symptoms of attack on many plants.

This volume will prove invaluable not only to the student of biology but also to the intelligent plantsman who will derive sound knowledge of a group of minute animal forms with which he is familiar chiefly from the effect they produce on his plants. The cultivator demands the application of scientific principles to practice and in this book he is well supplied by the author. The meticulous care which has been taken to present a complete and trustworthy list of host plants is praiseworthy and one that should be followed by all authors of textbooks. G. F. WILSON.

"The Florist's Art." By F. L. Osborne. 34 pp. 4to. Plates. (Lockwood Press, London, 1934.) Paper covers. 5s. net.

The florist's shop assistant should find the "foreword" in this publication quite helpful as it is complete with practical details and is instructive about materials and how to use them in forming wreaths, sprays, cushions, harps and all the various contortions that the public seems to like and pay for. There are articles on table decoration, flowers for funerals, and hints for court bouquetsalso one on a practical way of dyeing flowers and leaves for those whose taste tends in that curious direction.

The rest of the booklet is taken up with 17 full-page photographs of various well-made formal designs suitable for many occasions. Of these No. 14 stands out as showing good taste and No. 7 is conspicuously the reverse, being a representation of an open book of white flowers with "At Rest" written in some coloured blooms across its page. The time and skill to form such a gadget could surely have been used to better purpose.

The Florist's Craft "would perhaps have been a better title for this booklet. F. GALSWORTHY.

414 JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.

"Onions and Related Crops." 8vo. 56 pp. (H.M. Stationery Office, London, 1934.) Paper covers, 1s.

This is Bulletin 69 of the Ministry of Agriculture and is intended to show the methods of cultivation and packing for market used by growers in various parts of the country and abroad, the present state of the cultivation in this country, the directions in which expansion is advisable, and the diseases and pests liable to attack the crop. It does not lay down definite methods of cultivation, but gives a clear statement of the methods of different growers, leaving the precise plan to be selected according to circumstances. The information given is very valuable, and it is clear that not all the onions that might be produced in this country are grown here. It is, however, to be remembered that keeping-onions of a mild-flavoured type are required and that there is room for the development of varieties that meet these requirements or of methods of producing onions somewhat different from those at present practised in order to secure them.

The cultivation of shallots, garlic, chives, and leeks is also dealt with and there is a chapter on onion-growing on allotments and for exhibition. It is altogether a valuable shillingsworth.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Acer, Botanico-geographical Survey of the Maples in U.S.S.R. in connection with the History of the Whole Genus. By A. I. Pojarkova (Acta Inst. Bot. Acad. Sci. U.S.S.R., ser. I, fasc. I, pp. 225-374; figs. and maps; 1933).—This paper is in Russian with Latin definitions and an English summary (pp. 367-374), numerous text illustrations and maps showing distribution. The authoress proposes a new classification of the genus, which is divided into 32 series arranged in 15 sections, and considers its geographical distribution, etc., in relation to its past history. Twenty-four species are native to U.S.S.R.—W. E. S.

Acer, New and Little-known Species of the Genus. By A. I. Pojarkova (Acta Inst. Bot. Acad. Sci., U.S.S.R., ser. I, fasc. I, pp. 143-155; illus.; 1933).—The authoress describes six new or little-known Maples, Acer turcomanicum, A. assyriacum, A. hermoneum, A. persicum, A. Stevenii from the Crimea, A. subintegum from Japan.—W. E. S.

Apple Pollination Studies, 1928-1932. By W. H. Brittain and others (Canadian Dept. Agric., Bull. 162 (New Series); pp. 198; 73 figs.; 1933).— A description is given of the complete and comprehensive investigations on the entire pollination problem in orchards in the Annapolis Valley, Nova Scotia. The Bulletin is divided into six sections—viz. (i) Introduction, in which is discussed the Apple industry in Nova Scotia, and the factors other than pollination which affect fruit production; (ii) Pollination and Fruitfulness in Apples; (iii) Experimental Studies in Apple Pollination; (iv) Field Studies in the use of Insects as Orchard Pollinators; (v) Studies in Bee Poisoning as a Phase of Orchard Pollination Studies; and (vi) Literature cited. The point is stressed that pollination alone cannot ensure regular cropping, which can be effected only by attention to all necessary details of good orchard practice.—G. F. W.

Bush Path Flowers. (Nigerian Field, vol. 3, pp. 112-115; col. fig.; July 1934.)—Notes on thirteen native plants found in land which has been allowed to revert to forest (8), high forest (4) or as a weed (1). They are Combretum dolichopetalum and *C. bracteutum, semi-climbers, *Clerodendron splendens, *Bandeirea tenuiflora, Millettia pilosa, Barteria fistulosa, Celosia argentea, *Ceratotheca sesamoides (somewhat like a foxglove and used as a pot herb), *Brillandaisia Lamium, Paulowilhelmia polysperma, Gynandropsis pentaphylla, Cassia sp., *Commelina nutiflora. Those marked * are figured in colour.—F.J.C.

Cabbage Root Fly, Control of the. By E. E. Edwards (Journ. Min. Agric., May 1934, vol. xli, pp. 154–161).—Investigations over three years indicate that the most satisfactory method of controlling the Cabbage Root Fly is to water the plants with corrosive sublimate at a strength of r ounce to 8 gallons of water. The treatment consists in the application of 4-pint to each plant in such a manner as to flood the soil evenly round the base of the plants on three occasions at ro-day intervals, commencing four days after setting out the plants. Of the other methods tested, the most promising was obtained by the use of commercial naphthalene. About $\frac{1}{4}$ -ounce of this powder should be applied to the soil round the plants on three occasions at ro-day intervals, commencing on the day of transplanting.—G. F. W.

Caucasian Flora, New Species of. [Neue Arten der Kaukasischen Flora.] By G. N. Woronow (Acta Inst. Bot. Acad. Sci. U.S.S.R., ser. I, fasc. I, pp. 213-224; 1933).—Latin descriptions of twenty new species from the Caucasus, including Erythronium caucasicum, a Dogs-tooth Violet with white or yellowish flowers very close to E. Dens-canis, and Hedera Pastuchovii, an ivy close to H. colchica native to the Talysch district and north Persia.—W. E. S.

Colorado Beetle at Tilbury. By J. C. F. Fryer (Journ. Min. Agric., 1934, vol. xl, no. 10, pp. 907-912; 3 figs.).—The recent discovery of the Colorado

Beetle at Tilbury on August 21, 1933, has called for stringent measures for its eradication by the Ministry of Agriculture. This paper gives a detailed account of the circumstances of the outbreak and the measures—the application of arsenical compounds to the foliage and soil fumigation with carbon bisulphide—taken to deal with it.—G. F. W.

Cyclamen Mite and the Broad Mite and their Control. By F. F. Smith. (U.S. Dep. Agric., Circular 301, November 1933, pp. 13; 7 figs.).—The Cyclamen Mite, Tarsonemus pallidus Banks, has been recognized as a serious pest of glasshouse plants for many years, while the Broad Mite, T. latus Banks, has been found to occur simultaneously with the former species and probably is frequently confused with it.

A comparison is made between the egg, larva, adult female, and host injury of the species. A list of 58 plants is given which have been found to be attacked by one or both species—49 plants having been recorded as hosts of the Broad Mite, and 25 as hosts of the Cyclamen Mite. Short descriptions of the life history and habits of both species are given, while the question of spread is considered in some detail. The symptoms of attack on various glasshouse plants are described. The control methods advocated against these pests include: (i) the application of sulphur dust or diatomaceous earth, and spraying with a 1 per cent. white oil emulsion; (ii) fumigation with calcium cyanide; (iii) fumigation with naphthalene. These methods apply to the control of the Broad Mite, for the Cyclamen Mite requires somewhat different treatment—e.g. (iv) the immersion of infested plants for 15 minutes in water at 110° F., or their exposure for 30 minutes at the same temperature in a vapour-heat-treating machine. The effect of heat on the plants is described—the injury in most cases being negligible.

Escallonias in Golden Gate Park. By Alice Eastwood (Leafl. West. Bot., I, no. 8, pp. 65-69; 1933; I, no. 9, pp. 81-82; 1934).—Brief descriptions of twenty-five species and hybrids of Escallonia cultivated in the Golden Gate Park, California, with keys for their identification.—W. E. S.

Fraxinus, Studies in the Genus. 1. A Preliminary Key to Winter Twigs for the Sections Melioides and Bumelioides. By C. M. Whelden (Journ. Arnold Arb., xv., pp. 118-126; figs.; 1934).—A key for the identification of fourteen species of Ash in the winter condition based on dormant twigs. Important characters are provided by the form, colour, and hairiness of the scales of the terminal bud, by the leaf-scars and by the colour and hairiness of the twigs. The species described are F. pennsylvanica, F. bilimoreana, F. profunda, F. oregana, F. americana, F. texensis, F. syriaca, F. potamophila, F. quadrangulata, F. mandshurica, F. holotricha, F. oxycarpa, F. excelsior and F. nigra.—W. E. S.

Insecticides and Fungicides, Specification for Certain (Jour. Min. Agric., June 1934, vol. xli, pp. 225–228).—The standardization of insecticides and fungicides has been a subject for discussion for some years, and a preliminary note on these specifications was published in 1921 (R.H.S. JOURNAL, 47, pp. 101–102). The Association of British Insecticide Manufacturers has recently brought these specifications up to date, added further ones for certain compounds not previously dealt with, and drawn up agreed methods of analysis for the use of analytical chemists. The standard products for which specifications have been made are: (1) Lead arsenate (powder and paste); (2) Lime-sulphur solution; (3) Nicotine and nicotine sulphate; (4) Copper sulphate; (5) Bordeaux powder; (6) Burgundy powder; (7) Cheshunt compound; (8) Soft soaps for spraying purposes; (9) Cyanides (sodium, potassium and calcium); and (10) Formaldehyde.

Loganberry Cane Maggot, The. By L. N. Staniland (Jour. Min. Agric., May 1934, vol. xli, pp. 151-153; 2 figs.).—The occurrence of the larvæ of a fly, Phorbia species, tunnelling in the tips of young canes of Loganberry during 1933 is reported from South Devon. Records of previous attacks on Raspberry and on Loganberry are mentioned. A brief description is given of the life history of P. rubivora Coq., which is a serious pest in the United States and in Canada. Information concerning the species of Phorbia responsible for the isolated attack in South Devon is lacking. The measure which is suggested for controlling this pest is to cut out and burn all wilted shoots so soon as their presence is detected.

Mentzelia, A Monograph of the Genus. By Josephine Darlington (Ann. Miss. Bot. Gard., xxxi, pp. 103-226; figs.; 1934).—A detailed account of Mentzelia, sixty-one species being recognized. The name Mentzelia Lindleyi is confirmed

for the plant better known in cultivation as *Bartonia aurea*. The genus extends from central United States to the Pacific coast and from adjacent Canada south to Argentina, South America. It includes perennial as well as annual species; the colour of the flowers varies from almost white to greenish-yellow and deep orange.—W. E. S.

Narcissus Fly, The Large (Merodon equestris Fab.). By W. E. H. Hodson (Bull. Entom. Research, 1932, vol. xxiii, pp. 429-448; r plate).—Owing to the existence of certain discrepancies of opinion amongst authorities on certain points relating to the life history of this pest, it was considered necessary to work out the life history of the fly and to bring forward evidence concerning the possibilities of obtaining control of the pest under field conditions. The several stages—adult, egg, larval and pupal—are described and figured, while full notes are given of the biology and habits of the fly. A list of host plants is given; they are: Narcissus, Hyacinth, Tulip (rarely), Amaryllis, Habranthus, Vallota, Galtonia, Scilla, Leucojum, Eurycles and Galanthus. The symptoms of attack on newly lifted bulbs, bulbs at planting time, and in growing bulbs are described. Control measures are discussed in detail under the headings:—Cultural methods; Covering bulbs during growth; Removal and destruction of infested bulbs; Swatting of the adult flies; Hot-water treatment of bulbs; Submersion of infested bulbs in water containing chemicals; Fumigation of bulbs with (a) paradichlorbenzene, (b) carbon bisulphide, and (c) calcium cyanide; Deterrents to oviposition; and Poison-bait sprays. Finally, recommendations are made as to the most satisfactory combination of methods to use for the purpose of obtaining control of the pest under field conditions.—G. F. W.

Pseudosedum [Kritische Übersicht der Gattung Pseudosedum (Boiss.) Berger]. By A. G. Borissowa (Acta Inst. Bot. Acad. Sci. U.S.S.R., ser. I, fasc. I, pp. 105-116; figs., map; 1933).—The plants of this genus of Crassulaceae, which is concentrated in central Asia, have mostly been referred to Sedum or Umbilicus. The authoress gives detailed descriptions in Latin of the eight species recognized.

Salvia, Chinese and East Burmese Species. [Labiatae—Salvia (nebst Revision der chinesischen und ostbirmanischen Arten der Gattung).] By E. Stibal (Acta Hort. Goth., vol. ix, pp. 101–145; figs.; 1934).—This forms part of the enumeration of Chinese plants collected by Dr. H. Smith of Upsala in 1921–22 and 1924, but the author has extended it into a revision of the Salvias of China and eastern Burma and enumerates many other collections as well, including those of Wilson, Forrest, Henry and Ward. The author recognizes forty-two species, sixteen being new, and gives a detailed Latin key by which they can be determined, together with their distribution and synonyms.—W. E. S.

Spray for Fruit Trees, New Type of. By J. Turnbull (Jour. Min. Agr., xli, p. 431; fig.; Aug. 1034).—A new type of spraying nozzle for general use on fruit trees, capable of use with a short lance on trees up to 15 feet, and with a lance of 6 feet on the tallest apple trees, is described and figured.—F. J. C.

Strawberry Pests, Control of, by Hot-water Treatment of Runners. By W. E. H. Hodson (Jour. Min. Agric., 1934, vol. xl, pp. 1153-1161; 3 figs.).—This paper gives an account of the experimental work which was carried out during 1931-1933 on the control by means of hot-water treatment of four major pests of Strawberries—viz. Strawberry mite, Tarsonemus fragariæ; Red Spider mite, Tetranychus telurius; Strawberry aphis, Capitophorus fragariæ; and Strawberry eelworm, Aphelenchoides fragariæ. The immersion of Strawberry runners in water at 110° F. for 20 minutes is strongly recommended before planting—the lest seasons for the treatment being early autumn and mid-spring. A brief description of the method by which the best results may be obtained is given under the paragraph headings: Time and Temperature; the Treating Bath; The Plants; and The Time to Treat.—G. F. W.

Synthyris and Besseya, A Revision of. By Francis W. Pennell (*Proc. Acad. Nat. Sci. Philadelphia*, lxxxv, pp. 77–106; figs.; 1934).—These two genera are confined to western North America and are of predominantly montane or alpine distribution; Synthyris has blue or violet-blue flowers, Besseya violet-purple, yellow or white flowers. Both genera include plants suitable for the rock-garden, although only *S. reniformis* seems to be in cultivation. They are closely related to Veronica. The present revision gives a detailed key to the species and varieties, and particulars of distribution; the author distinguishes fourteen species of Synthyris and nine of Besseya as well as numerous varieties.

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Vegetable Insects and their Control. By Alan G. Dustan (Canadian Dept. Agric., 1932, Bull. No. 161 (New Series), 74 pp.; 65 figs.).—This Bulletin is devoted to a review of the more important insects attacking vegetables in Canada, together with recently recommended measures for their control. The first part deals with such phases as: The Simplicity of Insect Control; Insecticides; Table of Dilutions for Sprays and Dusts; General Discussion of Spraying and Dusting Operations; and Clean Culture and Other Practices which have a bearing on Insect Control. General feeders—e.g. Cutworms, Wireworms, Grasshoppers, Slugs, Capsid Bugs, Earwigs, Stalk Borers, Springtails and Millepedes, are discussed in general terms. The remaining pests are dealt with under their usual food plants—e.g. Insects attacking Asparagus; Beans; Beetroot and Spinach; Brassicas; Carrot; Parsnip and Celery; Corn; Cucumbers and Melons; Onions; Peas; Potatos, Tomatos, and Egg Plants. A useful discussion of the comparative merits of spraying and dusting for insect control is set out under the headings "Advantages" and "Disadvantages" (pp. 12-13).—G. F. W.

Woolly Aphis, Injury to Apple Trees due to Paraffin Oil used for the Control of. By R. McKay (Jour. Pomology, 1934, vol. xii, pp. 167-176; 2 plates).—The use of undiluted paraffin for destroying Woolly Aphis on Apple trees has been advocated by many authorities, and the cankers that frequently arise as a result of the treatment are assumed to be due to the fungus Nectria galligena. Experimental proof has been obtained that paraffin oil injures or kills the shoots of a number of Apple varieties, the most susceptible being 'Beauty of Bath' and 'Newton Wonder.' The current and previous year's wood was most scriously injured, but branches up to five years old were killed by a single treatment. The various types of injury by paraffin oil are described and figured. The use of paraffin oil or petrol alone on Apple trees is strongly condemned, but applications of methylated spirit were found to be harmless to the tree.—G. F. W.

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Vol. LIX. Part V. 1934.

THE GARDEN AT NYEWOODS.

By The Rev. Professor E. S. LYTTEL.

When I was asked to write about my garden for the R.H.S. Journal, I felt somewhat timid at including Nyewoods in a series which has contained accounts of such extensive gardens as Logan, Abbotswood, Thorpe Hall, etc. But I was emboldened by the reflection that the members of the R.H.S. are mostly not wealthy owners of large estates, and that some of them might be interested to hear of the making of a garden of moderate size by a fellow-member who has limited means though unlimited enthusiasm.

I suspect that few gardeners manage to secure their ideal garden, and when I bought Nyewoods four years ago I did not get all the conditions I desired. But I did get a good many. I wanted to grow a really good selection of the shrubs and plants now available, and I did not want to exclude things which were not everywhere hardy. I am fortunate, therefore, in having a garden on the South coast, near Southampton, which slopes to the south-west, and which is protected from the coldest winds by thick belts of trees. I especially wanted to grow in my new garden Rhododendrons and other Ericaceous plants, and I therefore wanted a non-limy soil. I know from such gardens as Highdown what glorious examples of some genera can be grown on chalk, but I know of few plants which die without lime, and I know of many which die, or at least refuse to thrive, with lime. I am therefore again fortunate in having a garden in which the soil is acid or neutral. Again, I wanted my garden to be a beautiful place, apart from the shrubs and plants I meant to add to it—that is, I wanted a garden which should be picturesque in its contours and in its

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established trees. I am therefore very fortunate in having undulating ground studded with fine old Scots pines, spruce-firs, birches, etc. There were indeed far too many trees at first. The name Nyewoods comes from the old word a "nye," or brood of pheasants, and these birds breed freely in the surrounding woods. The whole of the place, except near the house, was indeed practically a wood, and I had to cut down hundreds of trees to open up lawns and to make vistas and glades. This has been most interesting and also most anxious work, for it is not always easy to foresee the result of felling trees, and mistakes cannot be remedied. But I was very lucky in finding the best trees placed where they were wanted to give variety, dignity, seclusion and shade; and on the whole I am satisfied with the result. Finally, I wanted a fairly large garden, not only to give room for a large collection of all sorts of plants, but also to give variety, seclusion and a feeling of space. At the same time I wanted a garden which would not demand a large outlay on labour. Nyewoods fulfils these conditions, for it is nearly 8 acres in extent and gives me entire seclusion and much variety; but by leaving the outskirts semi-wild and by devoting much space to shrubs and woodland plants which require the minimum of attention, I can and do manage with a small outlay on labour.

So far I am satisfied, but there are some drawbacks. The main one is the absence of running water. I have a natural pond, I have made three other ponds, and I have laid water-pipes in all directions, but no garden is ideal without a perpetually flowing stream. A minor drawback is the formation of the soil. Nyewoods is an undulating valley sloping to the south-west. The soil on the upper part is peaty, while lower down there is strong loam, and I often wish I had some of the stronger loam at the top of the slope. My horticultural tastes are very catholic, and though I do not care for "bedding out," I do like formal beds of Roses near the house. I have planted some 1,500 Roses, including many of the floriferous 'China,' 'Polyantha' and 'Poulsen' types, and to make these succeed I have had to import a lot of loam to replace the thin peaty soil. Besides these bedding Roses, I have planted a good selection of Rose species. Some of the less hardy, such as xanthina, Ecae, macrantha, bracteata, etc., live on the upper slope, the others flourish in the stronger soil lower down.

So far in general as to the extent and nature of my garden. Particular written descriptions can convey little to readers who have not seen it, and photographs are not entirely satisfactory. I am also hampered by being asked to write too late to have photographs taken of what are the best parts of the garden—the glades and lower slopes, where in May and early June there is a profusion of flower from Rhododendrons, Azaleas, Primulas, Meconopsis, etc. But some idea may be gained from the photographs illustrating this article of the general outline of the garden and of the trees which so plentifully clothe the sides of the valley. One photograph (fig. 155) shows the view from the house with the Rose beds and the general slope to the lower wooded part. Another taken from the north shows the formal garden

(fig. 156) with its Lily pond, and this also gives some idea of the sloping lawns, and the tree-covered sides of the valley.

The formal garden was, when I came, a kitchen garden surrounded by a decrepit hedge of Cupressus macrocarpa. It is now laid out with beds of Roses, etc., with broad borders facing south and west, backed by high walls. On these walls used to grow fruit-trees. Some of these still remain, but they are rapidly being replaced or smothered with flowering shrubs or climbers. These borders and walls are just suited for the less hardy species, and they are filled with tender shrubs, bulbs and herbaceous plants. In the summer they are gay also with South African annuals. I always think that long lists of names make very dull reading, so I will not give a list of the plants which grow in these borders. I must, however, mention two climbers, Mutisia decurrens, which grows through a Myrtle, and Lonicera Tellmanniana, which is tangled up with Ceanothus × Burkwoodii, quite wrong horticulturally, but very effective. On another stretch of the wall there is a triple mix-up of Correa magnifica, Dendromecon rigidum and Solanum jasminoides, the last, of course, being kept in bounds with the knife. At another place I hope Clematis texensis and Hidalgoa Wercklii will give a summer covering to the lower branches of Camellia reticulata, which was transplanted from a friend's garden and has not liked it.

When I pass to the main part of the garden on the lower slopes and to the various glades in the wood, I will again try to avoid giving dull lists of names, and to describe the various classes of plants which I grow. Speaking generally I am, with one or two exceptions, a selector rather than a collector. My ideal has been not to collect the largest possible number of species, but to select what I think are the most beautiful species of all genera. Take flowering cherries, for example. The number of these is legion, and the perfectly legitimate ambition of some gardeners is to possess a specimen of every known variety. This does not appeal to me personally. I prefer to duplicate the best varieties rather than to include some which I think inferior though different. Prunus Miyako or longipes is one of my great favourites, and I have planted many of this variety. I especially admire the early flowering single cherries, and one glade, always called the "Cherry Wood," is planted with such kinds as Conradinae, yedoensis, incisa, concinna, etc. In this glade are also varieties of Amelanchier, asiatica, laevis and utahensis. The ground under these cherries is carpeted with Primroses of all colours, and later in the year there are masses of Cyclamen. Of the Pyrus group I have duplicated my favourites, floribunda, Eleyi, Zumi, Sargentii, and-best of all-Lemoinei.

Of the class of Conifers I have added but few, for my garden already contains so many fine established specimens, but I could not resist planting such distinctive beauties as Abies concolor violacea, A. Forrestii, and A. Pinsapo glauca. A mild climate tempted me to plant Fitzroya patagonica, and the sight of Tsuga Pattoniana glauca in a nursery made me quite certain that I could not live without it.

In the great class of Ericaceous plants I have to keep a firm hold

on myself to avoid giving lists of names. My soil suits so well these plants that I have planted them in all directions. I always carry about with me the Handbook of the Rhododendron Association, and mark those which I really want. My list of desiderata is a long one, and I have gradually secured most of the species I wanted, though a few still elude me. An outstanding favourite of mine is Rhododendron orbiculare, and I bitterly resent the suggestion in the handbook that it is chiefly attractive for its foliage. R. sutchuenense var. Giraldii, with fifty-three great trusses of bloom, was the glory of my garden last April. I am not one of those who despise hybrids, and I have planted a good number of the best. I had an exciting time last May. Besides two big bushes of named forms of R. Loderi, I had three Loderi seedlings which flowered for the first time. One was rather ordinary, one was a most glorious deep pink with enormous flowers, and the third waswhat do you think?—a pure yellow! Local Rhododendron experts got quite excited over this, and insisted on my cross-fertilizing the flowers. And then a too kind friend, who was helping me to remove seed-pods, removed the labelled pods of my yellow Loderi! I did wish I wasn't a parson! Of other Ericaceous plants I grow many Azaleas, species and hybrids, including a large number of the so-called Japanese Azaleas. A great addition this year was the original lavender form of A. ledifolia (R. mucronatum)—a very lovely thing. Outside the great genus Rhododendron I grow all the Enkianthus I can get, especially E. cernuus rubens; every Pieris, including the glorious Wakehurst variety of P. Forrestii; Kalmias of all sorts, and Clethras, including C. Delavayi and C. arborea. The last is very tender, but I am trying it in a special bed surrounded by evergreens and protected overhead by tall pines. Here it will be snuggled by such things as Anopterus glandulosus, Guevina Avellana, Lomatia ferruginea, Eucryphia cordifolia, Embothrium coccineum, and E. longifolium, and some of the more tender Rhododendrons of the Maddenii and Boothii series.

Of the smaller Ericaceous plants I grow Erica and Calluna in nearly all varieties, and in wide drifts. These are chiefly used to clothe the spaces between the Rhododendron beds and the outer fringe of pine and bracken. The paths between the heaths are informal ones, made of pine needles, and the whole effect is of a very natural merging of the cultivated into the wild.

When I approach the class of very dwarf Ericaceous plants I cease being a sane selector and become a rabid collector. A special part of my garden in half shade and with the best of leafy soil is my "Holy of Holies," for it is consecrated to a group of small shrubs to which I have quite lost my heart. I collect these tinies with fervour, and I have almost quarrelled with my good friend Marchant because he has not yet propagated Gaultheria reticulata. I cannot even begin to enumerate the names of these small shrubs, but I cannot imagine a life denuded of such gems as Arcterica nana, Cassiope lycopodioides, Leucothoe Keiskii or Phyllodoce nipponica. Most gardeners feel special joy in succeeding with difficult plants, and I am proud to record that

[To face p. 422.

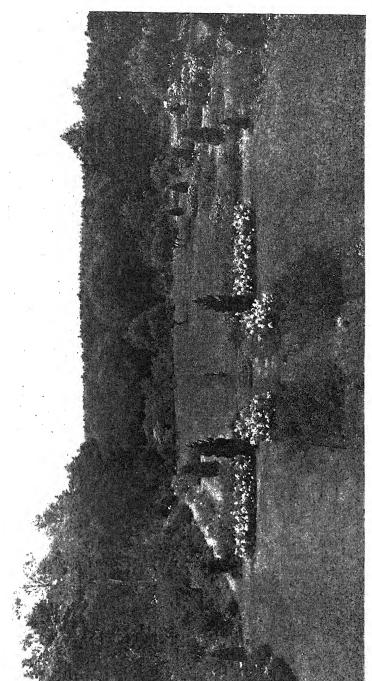


Fig. 155.—The garden at Nyewoods from the House.

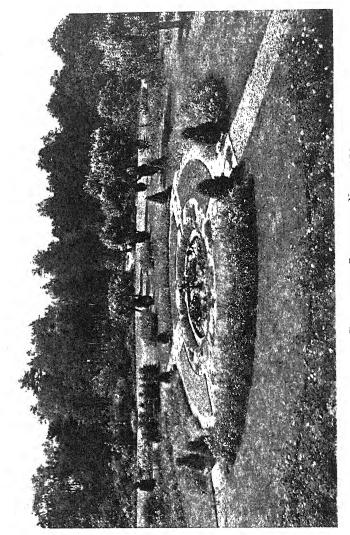


Fig. 156,—The formal Garden at Nyewoods.

Loiseleuria procumbens, Epigaea asiatica, and E. repens and Philesia buxifolia flourish with me.

Of shrubs other than Ericaceous I have planted a good selection, and most are doing well. I collect Daphnes with avidity, and have at last secured D. aurantiaca. I am very fond of species of Hydrangea as distinct from the florists' forms of H. hortensis, and H. Sargentiana in fat moist soil in shade has been a great joy. Outstanding favourites and successes are—Kolkwitzia amabilis, Nothofagus Cunninghami, a 10-foot high pyramid now clothed with Tropaeolum speciosum, Hoheria lanceolata, Corylopsis pauciflora, Berberis Bealei, and species of Syringa, which I prefer to the named florists' varieties. Eucryphias are slow to reach flowering age, but I have Billardieri and Nymansay growing well, and after visiting Bodnant I hurried home to plant many more E. pinnatifolia.

Amongst the shrubs I plant many herbaceous and other plants. Primulas and Meconopsis are of course in quantity, Cypripedium and Trillium do well, and two less usual plants have prospered—Anemonopsis macrophylla and Stenanthium robustum. The latter is very charming, and it was a healthy blow to my conceit when a plant I gave to a friend produced a finer plume than any of my own. But the class of plants which is most prominent amongst the shrubs and which has made the collecting germ break out afresh is the glorious class of Lilies. I have got Lilyitis very badly. I have already over sixty different kinds, and I foresee ending my days in the workhouse. Two photographs illustrate the effect of two common but very beautiful Lilies, Lilium regale (fig. 159) and L. auratum (fig. 162). Of other kinds some like L. Parryi are not yet established, most are doing respectably, some are doing quite well. L. centifolium flourishes, L. superbum is a literal tower of strength, and L. japonicum has made me think that it is not only the most beautiful of all Lilies, but almost the most beautiful of all flowers. L. Wardii is as yet only in its infancy, but L. Duchartrei Farreri ramps only too vigorously, and when a 3-foot high stem appeared in the middle of my best clump of Gentiana Loderi, I began to think that even with Lilies one could have too much of a good thing.

Mention of Gentiana Loderi leads me to the last class of plants I can mention in any detail. There are many classes of which I grow good though not specialist selections. I have many Iris species, and the generous owner of Hillside has set me up with a good number of the best modern bearded hybrids. I have no herbaceous border as such, but these plants appear all over the garden, and I am always on the look-out for something new or choice. Bulbs of all sorts have been planted, including many of the newer sorts of Daffodils. Erythroniums ramp with me, Globe tulips and Nomocharis do well, and I am tackling the difficult genus Fritillaria. Last spring I visited Barr's nursery to select good forms of Helleborus orientalis, and saw the Crocuses which this firm grows so well. I have an uneasy feeling that an attack of Crocus mania is impending. Violas, both species and hybrids, I collect with avidity. I have thousands of these, and no plants give a longer

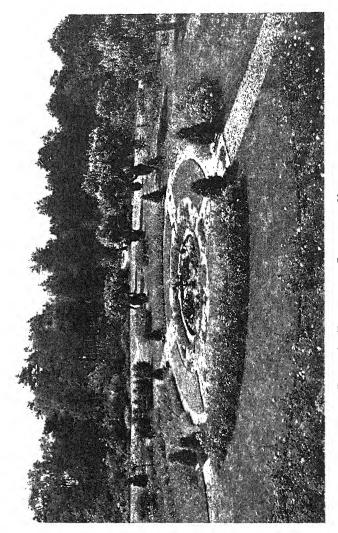


FIG. 156.—THE FORMAL GARDEN AT NYEWOODS.

Loiseleuria procumbens, Epigaea asiatica, and E. repens and Philesia buxifolia flourish with me.

Of shrubs other than Ericaceous I have planted a good selection, and most are doing well. I collect Daphnes with avidity, and have at last secured D. aurantiaca. I am very fond of species of Hydrangea as distinct from the florists' forms of H. hortensis, and H. Sargentiana in fat moist soil in shade has been a great joy. Outstanding favourites and successes are—Kolkwitzia amabilis, Nothofagus Cunninghami, a 10-foot high pyramid now clothed with Tropaeolum speciosum, Hoheria lanceolata, Corylopsis pauciflora, Berberis Bealei, and species of Syringa, which I prefer to the named florists' varieties. Eucryphias are slow to reach flowering age, but I have Billardieri and Nymansay growing well, and after visiting Bodnant I hurried home to plant many more E. pinnatifolia.

Amongst the shrubs I plant many herbaceous and other plants. Primulas and Meconopsis are of course in quantity, Cypripedium and Trillium do well, and two less usual plants have prospered—Anemonopsis macrophylla and Stenanthium robustum. The latter is very charming, and it was a healthy blow to my conceit when a plant I gave to a friend produced a finer plume than any of my own. But the class of plants which is most prominent amongst the shrubs and which has made the collecting germ break out afresh is the glorious class of Lilies. I have got Lilyitis very badly. I have already over sixty different kinds, and I foresee ending my days in the workhouse. Two photographs illustrate the effect of two common but very beautiful Lilies, Lilium regale (fig. 159) and L. auratum (fig. 162). Of other kinds some like L. Parryi are not yet established, most are doing respectably, some are doing quite well. L. centifolium flourishes, L. superbum is a literal tower of strength, and L. japonicum has made me think that it is not only the most beautiful of all Lilies, but almost the most beautiful of all flowers. L. Wardii is as yet only in its infancy, but L. Duchartrei Farreri ramps only too vigorously, and when a 3-foot high stem appeared in the middle of my best clump of Gentiana Loderi, I began to think that even with Lilies one could have too much of a good thing.

Mention of Gentiana Loderi leads me to the last class of plants I can mention in any detail. There are many classes of which I grow good though not specialist selections. I have many Iris species, and the generous owner of Hillside has set me up with a good number of the best modern bearded hybrids. I have no herbaceous border as such, but these plants appear all over the garden, and I am always on the look-out for something new or choice. Bulbs of all sorts have been planted, including many of the newer sorts of Daffodils. Erythroniums ramp with me, Globe tulips and Nomocharis do well, and I am tackling the difficult genus Fritillaria. Last spring I visited Barr's nursery to select good forms of Helleborus orientalis, and saw the Crocuses which this firm grows so well. I have an uneasy feeling that an attack of Crocus mania is impending. Violas, both species and hybrids, I collect with avidity. I have thousands of these, and no plants give a longer

display in a normal season than such hybrids as 'Lassie,' 'MacChaplin,' and others which I have collected. Every autumn I take some 2,000 cuttings to replenish the stock.

But no account of Nyewoods would be complete without mention of the rock garden. Alpines have always been my chief love, and I am always adding to my big collection. The main rock garden does not pretend to be a picturesque piece of rock building. It is homemade, and designed primarily to supply the right conditions for the largest possible number of alpines. It is studded with dwarf conifers. of which I have a big collection. My friend MURRAY HORNIBROOK, the great authority on these shrubs, has helped me in selection, in correct naming, and has given me some unique specimens. The illustrations of the rock garden (figs. 157, 158, 160, 161) give some idea of these Conifers, though they quite fail to show up properly the alpines which surround them. I have a second rock garden in which I plant newer species for isolation and propagation. When I have a stock of a new alpine it can then take its chance under the more crowded conditions of the main rock garden. Allied with this reserve rock garden are, of course, rows of propagating frames and plunge beds. And nearby is that great joy, an Alpine House. This was built on the site of a pigsty, and I hope the ghosts of the pigs appreciate the beauty of this house, especially in spring and early summer when it is ablaze with every kind of Kabschia and Engleria Saxifrage, Androsace, Lewisias, and many small bulbs.

Such is Nyewoods, not a large or impressive or expensive garden, but a garden which has much natural beauty and which contains a very varied selection of plants which on the whole are answering happily to the love and enthusiasm of the owner.

THE PERPETUAL-FLOWERING CARNATION.

By L. Cook.

[Read Nov. 28, 1933; G. Monro, Esq., C.B.E., in the Chair.]

WE are here to discuss one of the most-talked-about plants in cultivation, and indeed so much has been said and written about the Carnation that some might wonder whether anything fresh can be said about it. Judging, however, from my experience of this flower (which goes back some thirty years), we can still go on learning about it and changing our methods of cultivation.

I have come here to-day without any lantern slides or illustrations other than a plant in front of me, for I want to present to you the Carnation as it is, and what it is likely to be in the future.

In order to understand the Carnation of the future it is helpful to know about its past, for the Perpetual Carnation, as we know it to-day, has changed and will continue to change. When we know that the original Carnation from which came the Perpetual Carnation of to-day was a native of the sea-coast of Southern Europe, we realize that we have a plant which requires fresh air. One of the first errors in its cultivation is to starve it of fresh air, and any liberty taken in this respect brings retribution.

The evolution of our present method of growing the Perpetual Carnation is interesting. In 1903 I arranged some vases of the Old English Tree Carnations at the Temple Show. These were grown as greenhouse plants, and we even used to force them in winter to open them at given dates. Then, in 1904 I believe, Mr. Dutton exhibited a couple of vases of American Carnations at the Temple Show. These American Carnations were quite different from the English Tree Carnation, both in flower and habit of plant. The feature of the flowers was deep fimbriation of the petals, and the plants produced more flowers than the Old English Tree Carnation.

Many people objected to the deep fimbriation of the flower, and I well remember a conversation with the late Mr. MARTIN SMITH who was shocked at their rough appearance.

Quickly after the advent of 'Mrs. T. W. Lawson' an English grower, Mr. Smith of Enfield Highway, raised a seedling from 'Mrs. Lawson' and, I believe, the English variety 'Winter Cheer.' This had petals far less fimbriated than 'Mrs. Lawson,' but with the plant more akin to the American variety than the English Tree Carnation.

As an instance of how completely the cultivation of the Perpetual Carnation has changed in twenty-five years, I might mention that then we grew our plants in summer outside, planted in the field in the same way as the Americans. A later development from this was to grow them in pots outside, as one grows Chrysanthemums, the plants in each case being brought into the greenhouse at the end of August. As, however, there is a great risk from a wet summer which may make the plants too soft or insufficiently ripened to flower in winter, we now grow them entirely under glass, although they may be grown in frames with lights to cover them in wet weather.

To demonstrate how different growers arrive at the same end by different ways, I will raise and deal with some points on which we do not all agree.

The art of growing a plant is not learnt by a dogma or rule of thumb. I have found different growers get good results even by using different soils. The general run of opinion is against using leaf-soil as an ingredient of the compost, but I have known good growers employ it when their loam is not turfy and deficient in humus. Personally I do not advocate it, and we do not use it at Enfield where we have a very good turfy loam, yet with an unsuitable soil I would not hesitate to use it to mellow the compost for the first potting.

You are doubtless aware that while the majority of commercial cut-flower growers grow their Carnations planted out in beds, the majority of Carnation amateurs grow them in pots. While differences of opinion exist as to the relative value of the two methods, I think that it is quite plain the two methods are best suited to the two types of growers, who have different aims. The commercial grower can keep his beds for two years or more, but the plants become unsightly after the first season. They cost less to cultivate.

On the other hand, from the amateur's point of view, as he has fewer plants to cultivate he can obtain more satisfaction from growing his plants in pots. He can obtain more flowers during the winter than if they were planted out, although the advantage in this respect lies with the market grower the following spring and summer.

The successful cultivation of the Carnation depends on a few fundamental conditions followed by a sequence of correct methods. Let me explain what I mean. We must follow the laws of Nature and propagate only from healthy vigorous stock. It is waste of time to try to grow on cuttings obtained from weakly plants. The cuttings when rooted must have ample light and buoyant atmosphere after they are established in small pots, and for that reason a shelf in the greenhouse is the best place for an amateur to grow them early in the vear.

The potting of the rooted cutting taken from the sand in which it is rooted really requires care to see that it is not potted deeply, which fault is rather common, and is fatal. The rooted cutting should have the roots only just covered, and this rule must be adhered to at each subsequent potting.

There is also a considerable variety of methods in dealing with the stopping of Carnations. We find distinct differences of practice in connexion with stopping. The old method of stopping a plant low down in order to induce a bushy plant and then stopping again

Fig. 157.—The Rock Garden at Nyewoods.





Fig. 159.—Lower slope of Rock Garden at Nyewoods.

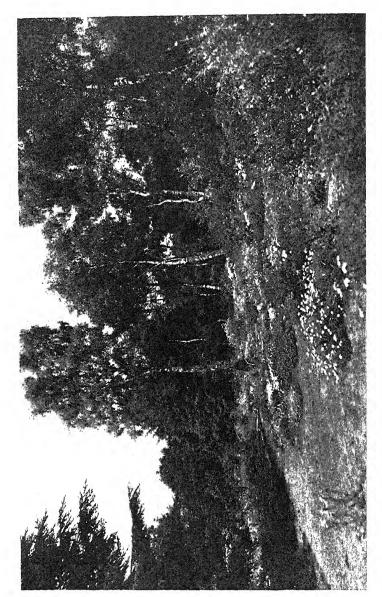


Fig. 160.—The second Rock Garden at Nyewoods.

as soon as possible has been challenged by more modern growers, and I think they are right. It is only theory which argues that frequent stopping produces the best plants. I am definitely in favour of stopping a plant higher up than we did a few years ago. This stopping by breaking out the top of the young plant 6 inches high instead of two or three inches of the top of the plant means that we break into somewhat softer wood and this comes into growth more freely than if we stop into hard wood. I do not mean that we should remove the point of growth only, but allow the young plant to develop a little more before we give the stop and then break into firm brittle wood.

Then, with regard to the second stop, instead of breaking out all the growths of a plant it is better to stop only approximately half of them, and at intervals of a couple of weeks, leaving the more backward growths unstopped to develop into the first flowers. To sum up this point, I would say that it is not desirable to have an unlimited number of shoots to a plant, because there is a limit to what a root will profitably grow and more especially cause to produce flower.

There is a limited number of varieties, of which 'White Pearl' may be taken as an example, which are better stopped once only. If this stop is given some 6 or 8 inches high, the subsequent breaks are sufficient to make a good plant which produces its blooms (from spring-struck cuttings) by autumn, and in mid-winter.

In order to secure autumn and early winter flowers no considerable stopping should be done after the middle of July, and it is safer to do it early in the month. Some varieties indeed are better stopped at the end of June.

While I do not propose to enter into the entire routine of growing Carnations, a few salient points may be mentioned, and because of the great change from winter to summer cultivation I would like to call attention to this. I have seen quite good gardeners exercising the same care in summer watering as in winter. If the plants are healthy this is not necessary. It is quite meet and right for a grower to water his plants according to their needs in winter, taking care not to overwater any of them, but when warm spring and summer days come and Carnations are growing well, water should be given freely. I suspect many growers do not water freely enough when the plants are growing quickly. In this respect the cultivation of winter and summer is quite reversed.

The soil in which Carnations are grown is of real importance. For the final potting it should be of somewhat coarse nature, and chopped instead of being put through a sieve as in the early potting. A good mixture is of turfy loam which has been stocked a few months, 4 parts; sand, $\frac{1}{2}$ part; mortar rubble, $\frac{1}{2}$ part; well-matured manure, I part (stable manure for heavy loam, cow manure for light soil). To each barrow load of soil some wood ash and a 6-inch potful of soot and the same of Carnation Fertilizer are added. The pots must be well drained or crocked, as we say, because Carnations must be potted firmly.

If you ask why firm potting is necessary I would say because you want firm stems, and this is one of the factors that go to make them.

A stick should be put to the plant at the time of potting, and the shoots secured as soon as possible, as they break off so easily if not secured.

No good cultivator would overwater a freshly potted plant, but water it well when it needs it and leave it until water is needed again.

Just as we water freely in summer and sparingly in winter, so do we feed our plants freely when growing in spring and summer, and stop feeding when they are growing slowly in winter. The plant speaks for itself in this respect. One gives weak liquid manure water in spring and summer, or a top dressing of Carnation Fertilizer monthly in the spring and summer months to flowering plants. Plants freshly potted need no stimulant of course, but a top dressing to young plants coming into bud in early autumn is good.

Carnations should not be fed if at all unhealthy.

Maladies in connexion with the Carnation have always been somewhat of a bogy. For some reason many people seem to think the Carnation more prone to disease than other plants. I remember in my young days hearing of rust as some dire trouble, but rust itself is more of a bogy than a serious disease. Even in these more enlightened days some amateurs worry about rust and overlook the more serious trouble of red spider. Red spider is by far the worst trouble the amateur has to consider. As you may be aware this flourishes in dry draughty conditions. If you grow your plants on benches or stages which have open laths to hold the plants, instead of solid benches or stages covered with ash, gravel or similar material to hold moisture in dry summer days, you are inviting the attack of red spider. The solid bench or even the cool ground itself is the best place in hot weather. Again, in hot weather a syringe to spray with force under the foliage is good to keep away this pest.

An occasional fine spray of salt and water under the foliage in warm weather is good. One dissolves about 2 ounces of common salt in a gallon of water. This is not good in winter because of the continual damp it engenders. Salt and water must be kept from the flowers. When once the presence of the minute red spider is detected drastic and immediate steps must be taken to clear the plants of it. Young plants (but not flowering plants) may be dipped in a solution of sulphide of potassium 1 ounce, soft soap 2 ounces, which is made into an emulsion with 2 gallons soft water. Add to this $\frac{1}{2}$ wine-glassful of paraffin well churned up. The plants are then laid on their sides to drain. As a matter of fact, in these days red spider is more easily controlled, as we have a new invention named the Monro Lamp which fumigates with napthalene. The temperature of the house must be run up for this purpose not below about 70°. Select a still evening and the lamps should run for about ten hours.

In connexion with diseases of Carnations it is interesting to note that people who know most about Carnations suffer most from stem

rot. The reason for this may be briefly stated to be that they are the commercial growers of cut flowers who grow their plants planted out in beds. These beds when once infected become difficult to sterilize, whereas the amateur who grows his plants in pots has more control, and if a plant dies from stem rot the soil is thrown away and does not infect another plant.

It is likely that those troublesome little insects, the Thrips, do more harm to Carnation flowers than many people realize. They quickly cripple the flowers in autumn. Control is best through fumigation with nicotine, or spraying with nicotine in solution. Of course, one fumigates in the evening when the sun is on the wane.

I think I can claim to have arranged groups of Carnations at the meetings of the Royal Horticultural Society for a longer period than anyone else, and during my experience have been asked many questions by amateurs as to their difficulties. Among these I have been often asked why an amateur's plants become "leggy." One lady asked me this question several times and always blamed her gardener. At length I found she always cut her own flowers, and with short stems, as she did not (as she said) like to spoil her plants. I was able at once to show her that this was the cause of her trouble, because the next growth came from where she had cut her stem.

It is always well to cut a flower with sufficient length of stem so that the cut is made nearly into the middle of the plant.

Another point sometimes raised, is the condition in which flowers arrive at a town house from the gardener in the country. Some varieties last much better than others, but it is necessary to cut flowers just before they are fully open in the early morning, and allow them to soak in water for several hours before dispatch. Firm packing in the boxes is essential, and the method employed by commercial cut-flower growers seen at every show of the British Carnation Society is the best. It is highly interesting to note how well these flowers arrive after a journey, and how fresh they remain after being cut and out of water for a couple of days at these shows.

Often and often I have heard people bemoan the loss of scent in Carnations, but this is as much the fault of people who choose a variety for the size and colour of its flowers as of the raisers of novelties. Of course, fragrance is an elusive quality. Most varieties which smell sweetly in spring, summer and autumn, lose their scent in winter. I have often smelt a flower and noted its pleasant scent in the greenhouse one day, but in the Horticultural Hall, where the atmosphere is dry and somewhat dusty, the scent the next day was not apparent.

One of the things which displeases the amateur more than the cut-flower grower is the splitting of the calyces. This is due to a great variety of reasons. In mid-winter, when we have little sun, it is Nature's kind way of releasing the flower from its slow development. On the other hand, split calyces may come from too high or too low temperature, insufficient ventilation, as well as from lack of greeny and good health in the plant.

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Some varieties with very full centres, or calyces packed with petals, nearly always split in winter, due in no way to bad cultivation.

The cut-flower grower places rings round the calyces of his flowers, and it is a good method, since some of our best varieties often split in mid-winter.

Time does not permit us to discuss other types of Carnations, the Border and Malmaison types, but I would like to refer to the Perpetual Malmaisons. This class has Malmaison flowers with growth very similar to the Perpetual Carnation. It is a mistake to grow it as a Malmaison, for it should have the same house as ordinary Perpetual Carnations, whereas the old Malmaisons are better grown in a cold house, unheated, or in a frame.

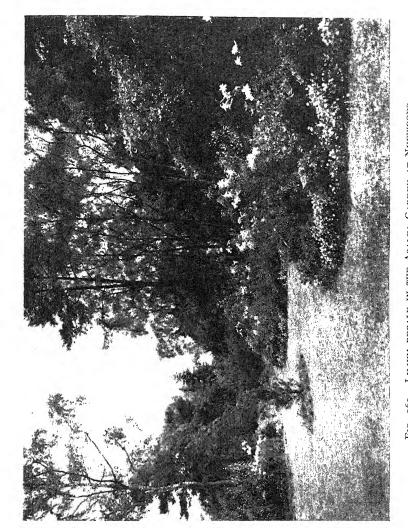


Fig. 161.—Lilium regale in the Azalea Garden at Nyewoods.

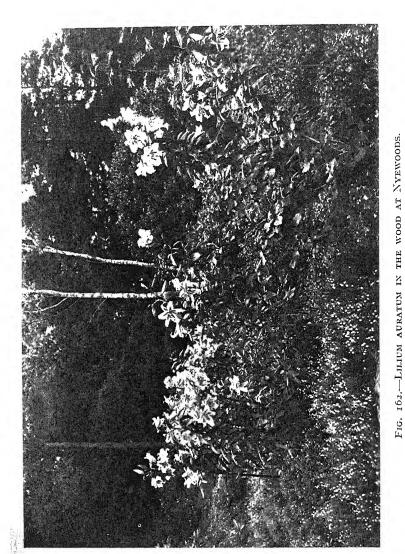


FIG. 102.—LILLUM AUKAIUM IN THE WOOD AL LYEWOO

GENTIANA LODERI AND GENTIANA CACHEMIRICA.

By C. T. MUSGRAVE, V.M.H.

So alike are the flowers of these two Gentians that it would be by no means easy to attempt to distinguish between them from the flowers alone without some portion of the flowering stem. There is, I understand, a botanical difference between the shape and size of the lobes of the calyces of the two plants. In G. Loderi these lobes are generally broad, green, leathery and inclined to reflex as the flower goes over, while those of G. cachemirica are generally long, narrow pointed and upright with a marked division or space between them. I doubt if this distinction alone is one on which absolute reliance can be placed, but fortunately the plants can be readily distinguished in other ways, and, when full-grown plants of the two Gentians are seen in flower there should never be any confusion between them.

In attempting to give a general idea of the appearance of these two Gentians and of their habits and characteristics I am assuming that the plants are fully grown and in flower. In younger plants the distinctions given below may not be so clear.

G. Loderi forms an almost flat circular plant about ten or twelve inches in diameter, with a series of almost straight, thin, green, flowering stems (there may be as many as sixty or seventy on a plant) all of approximately the same length, and lying flat on the ground like the spokes of a wheel around the central rosette of leaves. The flowers are borne at the ends of the stems which turn upwards an inch or so as the buds appear. Young plants have one terminal flower only, while in older plants there may be three or more. The colour of the flowers is a silvery blue, and the outside ring of the circle formed by the plant is entirely composed of flowers.

G. cachemirica is a plant of the wet rocks of Kashmir, generally, I believe, growing on the vertical face of a rock and pushing its roots far into the crevices, the flowering stems all hanging downwards. Such conditions cannot be found in many rock gardens in England, and here this Gentian forms an irregular straggling plant about 15 inches or more across with numerous purplish red stems which vary in length from 6 to 12 inches and which are curling, some upwards, and others lying flat on the ground and curling one into another. The flowers are carried at the ends of the stems, generally singly, but there may be short branches near the ends of the stems each carrying a flower. I have seen as many as seven. The shape of the flower is similar to that of G. Loderi, but the flowers seem to vary both in colour and size and are sometimes much larger than those of G. Loderi. In its own country G. cachemirica is probably

as good a plant as, if not better than, G. Loderi, and it is certainly a stronger grower, but here it does not show itself off so effectively.

Neither of the plants is difficult to grow on the rock garden in a sunny position in light soil, well drained, and amply supplied with water in the growing season. It is, however, advisable to plant G. Loderi as far away as possible from all other species of Gentians which may flower about the same time. Bees and other insects seem to have a delight in carrying the pollen of any other Gentian which may be handy to the flowers of G. Loderi, with the result that seedlings are frequently not true. The difference is often slight, and generally consists in the lengthening of the leaves of the central rosette and of the flowering stems, with an increase in the number of the terminal flowers. I have two plants raised from seed taken from a true plant of G. Loderi with flowering stems over a foot in length and carrying as many as eight terminal flowers in an almost flat corymb. The flowers of these plants are lighter in colour than those of the true plant, but in size and shape there is little difference.

- G. Loderi (Hook. Ic. Pl. xv. t. 1440 (1883)) was introduced to this country more than fifty years ago. About the year 1880 seeds of a Gentian were sent to the late Sir Edward Loder by a Mrs. Radcliffe from Kashmir. Plants raised by him from that seed were found to be an unknown species and were named by Sir J. Hooker G. Loderi after the raiser. Nothing further is definitely known of the plant and it seems improbable that it was ever widely grown in England. Seed was again sent from Kashmir towards the end of the year 1927 and the plants I have were raised from that seed.
- G. cachemirica is of much more recent introduction. It is to Mr. B. O. COVENTRY, late of the Kashmir Forest Service, that we owe this Gentian. Plants and seeds were sent by him a tew years ago to this country. A plate showing its flowers appears opposite p. 78 in the third volume of his Wild Flowers of Kashmir. He describes it as "a beautiful alpine rock plant with tufted drooping stems and large bright blue flowers . . . growing on rock cliffs at elevations of IO-I3,000 feet."

BARBERRIES AT WISLEY.

By W. J. Bean, I.S.O., V.M.H.

Amongst the hardy shrub collections at Wisley there is no genus more adequately represented than Berberis. The soil and situation evidently suit them perfectly, and the shrubs, as one sees them there, afford an excellent opportunity for Fellows of the Society in particular, and cultivators in general, to study the genus and make a selection for their own gardens. The exploration of China during the present century has increased the number of species in cultivation to an embarrassing extent, and the chief difficulty for cultivators now is to afford space for an adequate representation of the genus without crowding out other and perhaps better things. A visit to Wisley will be of great assistance in this direction.

On September 5 I inspected the collection in company with Mr. Chittenden and the Director, and I have to thank them for their courtesy and assistance. The only really important species which I either overlooked or failed to note was Berberis Vernae—a species that ought not to be omitted from even a very small collection. At that date the Barberries had not attained their full autumnal beauty, and the abundant crops of fruit were as yet only promising the rich feast of colour they have, no doubt, since provided. Nor had the foliage more than just begun to acquire the tints which render the Barberries so important a factor in the autumnal display of colour for which Wisley is famous.

The section of the genus on which, more than any other, Wisley has specialized is that which has B. Wilsonae as its best-known species. There is not only a fully representative lot of the species themselves, but also a wonderful series of hybrids derived from them. Those whose memories of the Fortnightly Meetings go as far back as November 1916 will remember the mild sensation aroused in the Hall by the appearance of the first of these hybrids, now well known as $B. \times$ rubrostilla, whose beauty I do not think has since been surpassed. It was followed by others, shown by the Society from time to time, several of which have been given Awards of Merit and are further alluded to in the following notes. There is a large group of these hybrids, very vigorous and healthy, growing on a slight mound at Wisley, which should, I think, be severely thinned out so as to give full space to those that remain. The full beauty of dense-habited shrubs like these can never be shown when the plants are so closely packed.

There are only a few European species of Berberis, and amongst them B. vulgaris is the only one worth general cultivation. At its

best, both in flower and berry, there are few of the deciduous species that surpass it in beauty, but it has long been frowned upon as harbouring the wheat-rust fungus in one of its stages.

The first notable additions came from the Himalaya about 1820, when B. aristata and B. Chitria were introduced, and soon after South America contributed B. buxifolia and B. empetrifolia. Sir JOSEPH HOOKER, during his Himalayan journeys (1849-1851), sent home B. angulosa, B. concinna, B. Hookeri, B. insignis, B. Lycium and B. virescens, and the Veitchian collectors, LOBB and PEARSE, reinforced the genus in gardens from South America. A notable event was the introduction of B. Darwinii by the former in 1849.

But the greatest augmentation of the genus, and the superabundance of species in gardens at the present time, have been due to the exertions of E. H. WILSON and other workers in Central and Western China and Tibet. SCHNEIDER, in Plantae Wilsonianae, alone deals with upwards of forty species. Comber, during his Andean travels, added to cultivated Barberries some really notable species, such as B. montana, B. linearifolia, B. lologensis, B. chillanensis and (botanically) B. Comberi.

Not much need be said about cultivation, for Barberries are amongst the most easily grown of shrubs. Mostly they prefer to be in full sunshine, but the evergreen species with dark green leaves, like B. Darwinii and B. verruculosa, succeed admirably in semi-shade. They will grow in almost any soil that is not water-logged or too poverty-stricken, and the species are easily propagated by the abundant seed they ripen, although it is liable to be mongrelized in extensive collections. The hybrid B. stenophylla and others of its set are easily propagated by cuttings put in very sandy soil in a cool frame or under a bell-glass. I was glad to learn that cuttings of the true rubrostilla had rooted. The identity of this fine Wisley production is in danger of being swamped by the numerous plants raised from its seed, which can only rarely be expected to come true.

B. vulgaris.—There is a variety of the common Barberry of special interest that is known as asperma, whose berries, like Sultana raisins. contain no seed. This character gives it a particular value for jellymaking and in confectionery. One hundred years ago Rouen was celebrated for its confitures d'épine-vinette, a sweetmeat made from these berries, but whether that city still produces them I do not know. As regards the shrub itself, I have found it a very elusive one, and have never yet seen it growing unmistakably true to name. There used to be plants at Kew so called, but they produced berries that were seeded as freely as the type, and there is now one at Wisley similarly disappointing. The old-time writers, like DUHAMEL in France and MILLER in England, aver that the production of seedless berries is characteristic of old plants only, and that young plants raised even from suckers are at first fertile. The plants at Kew were pretty old; the one at Wisley is a comparative juvenile, so it is possible it may yet acquire the seedless character. This variety is no doubt now

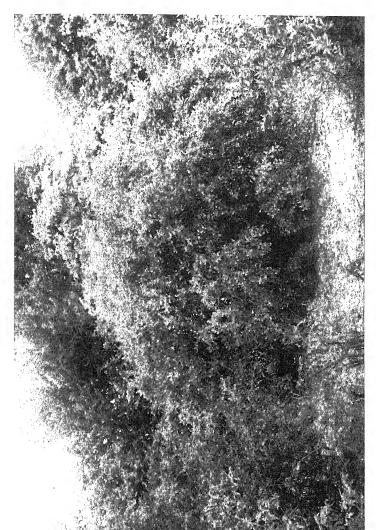


Fig. 163.—Berberis Regeliana at Wisley.



Fig. 164.—Berberis stenophylla at Wisley. (12 feet high, 15 feet across.)

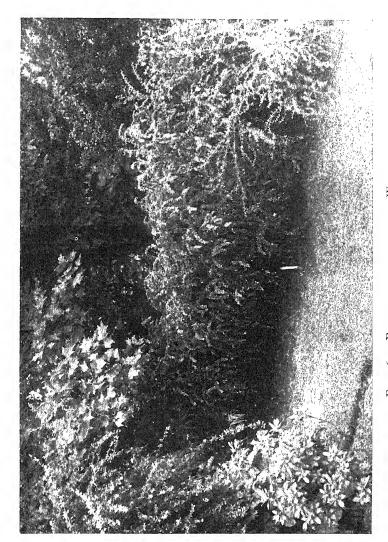


Fig. 165.—Berberis verruculosa at Wisley.

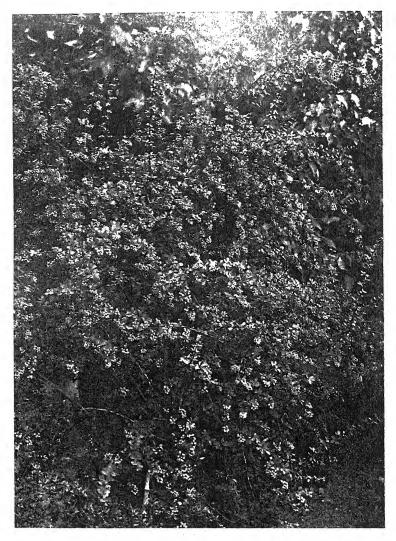


Fig. 166.—Berberis polyantha in hedge at Wisley.

very uncommon, but Kew received a berry-bearing branch from Mr. J. Wilkinson, The Grange, Kirkcudbright, in November 1914, which was entirely seedless. Wisley has a variety of *vulgaris* with white or pale yellow berries: rarely seen nowadays, it was known to the old writers.

- B. Regeliana.—Amongst the taller Barberries at Wisley is one named Regeliana, a slender shrub 12 feet high (fig. 163). This name was given to it by Koehne, but Rehder has since made it a variety of amurensis, under the name japonica. Schneider regards it as coming between amurensis and vulgaris. It is certainly closely related to the latter and the botanical differences between them are not very clear; but the leaves of Regeliana are twice as large as those of vulgaris, of a brighter green, and the shrub is more erect. The flowers are pretty much the same but perhaps of a paler yellow, the racemes are not so pendulous, and the berries rather larger. Schneider regards it as the handsomest of the Vulgares Section.
- B. Darwinii (and its group).—Darwin's Barberry is so well known and so much admired that nothing more need be said about it here, but there is at Wisley a very good selection of hybrids in admirable condition that have been raised from it. To my mind the finest of all is B. stenophylla, which fills a place in the very front rank of flowering evergreens. It was raised in the Handsworth nurseries, near Sheffield, about 1860, the other parent being empetrifolia. A noble plant at Wisley (fig. 164) forms a conical mass 12 feet high and 15 feet wide. As with most hybrids it cannot be relied on to come true from seed, but some quite interesting and pretty Barberries have been raised from it, some of the best of which we owe to the late Mr. T. Smith of Newry. Most of them are considerably dwarfer than B. Darwinii or B. stenophylla. The following, among others, are growing at Wisley: coccinea, notable for its scarlet flower-buds; corallina, also with red flower-buds and the flowers themselves tinged with red; compacta, usually under 3 feet high; Irwinii, dwarf and compact; glauca, showing a curious break in leaf colour; reflexa and gracilis, with arching stems.

As already noted, Comber's recent travels in South America have brought some good new species into cultivation, not only beautiful in their flowers but especially welcome for their distinctness from the Chinese crowd. There are small plants at Wisley of B. linearifolia, a very beautiful ally of Darwinii, with flowers $\frac{3}{4}$ inch wide, of a beautiful apricot tint outside and rich orange colour within. As regards the individual blossom there is no finer Barberry. It is quite distinct from Darwinii in the leaves, which are longer and narrower, glaucous beneath and not toothed. In future years it should make a very notable feature in many gardens. Comber also found what is believed to be a hybrid between Darwinii and linearifolia near Lago Lolog, which has been named B. \times lologensis. With such parents it could scarcely be other than a fine shrub, which it undoubtedly is. It is evidently very hardy and is already 6 feet high at Wisley.

WALLICHIANAE SECTION.

The species that Dr. Schneider has brought together in this group comprise some of the most important and attractive of evergreen Barberries. They are all natives of Temperate Asia and are well represented at Wisley. All of them bear black berries, sometimes covered, however, when young with a purple or whitish bloom. B. Wallichiana itself is not (perhaps never has been) in cultivation, although other species, notably Hookeri, have masqueraded under the name.

- B. Hookeri is a Himalayan species that has been in cultivation since the middle of last century. There is an attractive form of it at Wisley, the plant being scarcely 2 feet high, very rounded and compact, the leaves glaucous white beneath. This glaucousness is characteristic of the type only; much commoner in gardens is var. viridis, whose leaves are bright green beneath. A mass of it at Wisley is 5 feet high and 15 feet across.
- B. candidula, closely akin to B. Hookeri, is a neat and pretty evergreen, probably never much more than 4 to 5 feet high. It usually forms a dense hemispherical mass of leaves and branches. The leaves, as in Hookeri, are white beneath, the flowers solitary, large for a Barberry, bright yellow, followed by ovoid berries covered with a purple bloom. It is useful for places where space is limited and shapely enough to be quite suitable in formal dispositions of shrubs. It came to this country from Western China by way of France.
- B. verruculosa is represented at Wisley by several fine plants 4 or 5 feet high (fig. 165), which show admirably the charm of this shrub, its compact rounded shape, its gracefully arched although stiff young shoots, and the very dark glittering green of its small leaves. The flowers, often solitary, are rich golden yellow; fruits black covered with purplish bloom. Like the preceding species, this is one of the best dwarf evergreen Barberries.
- B. insignis, a native of the Himalaya, is well distinguished by the size of its leaves, which are the largest amongst evergreen Barberries and ordinarily up to 5 inches long and 13 inch wide, but occasionally 2 inches longer; they are frequently solitary at the joint, the margins well armed with stiff, strong spines. The flowers are clustered at the joints, ten to fifteen together. It is a very fine species at its best, but not very hardy; a plant at Kew succumbed during the winter of 1928–29. The plant at Wisley appears to be true to name.
- B. Julianae and B. Sargentiana are two very fine evergreen species, closely related and often confused in gardens. Schneider includes them in the Wallichianae group. There is at Wisley a fine plant of the former, 9 feet high, very leafy and dense in habit, notable for the deep green and hard texture of the leaves and the length and strength of its three-pronged spines. The plants first raised in this country from Wilson's seeds as Sargentiana were really this species. true Sargentiana has reddish, round young shoots; in Julianae they are angled; the berries also of Julianae are more thickly covered with blue

bloom, and the stigma at the end is distinctly stalked; in Sargentiana it is sessile. I was informed that Julianae is the hardier of the two at Wisley, and that is the general experience. It has been described as the only really hardy evergreen Barberry in the Arnold Arboretum. Frequenters of the Fortnightly Meetings may remember a plant shown by the late Hon. Vicary Gibbs as Sargentiana in November 1916. It was given a First-class Certificate because of the brilliant red colouring of its older leaves.

- B. replicata, discovered and introduced by Forrest in 1917, was first raised in quantity at Wisley, and having been freely distributed from there is now frequently to be seen in gardens. It is one of the most easily recognized of Barberries, more especially by the narrowness of its leaves, their strongly reflexed margins, and the whiteness of the under-surface. One plant at Wisley is 6 feet high, and has spread so much by sucker growths that it is now 7 feet wide. The flowers are clustered three to ten together at the joints, followed by oblong berries that are at first red, finally black.
- B. triacanthophora.—A plant of this evergreen Barberry, about 7 feet high, is attractive in its graceful shape and arching branches. It bears some resemblance to the commoner Gagnepainii and has similar spiny-toothed narrow leaves, but they are shorter and only 1 to $1\frac{1}{4}$ inch long and slightly glaucous beneath. The branchlets are reddish and very formidably armed with three-pronged yellowish spines I inch long. The ellipsoid berries are $\frac{2}{3}$ inch long, blue-black when ripe. The species came from Central China in 1907.
- B. Gagnepainii is well represented at Wisley, one plant being 8 or 9 feet high. Introduced in 1904 from Western China, it is now quite well known and frequently seen in gardens. The leaves are up to 3 inches long, green beneath and thereby distinguished from those of triacanthophora; the flowers also are a good yellow, whilst those of triacanthophora are very pale, almost whitish. B. Gagnepainii is figured in the Bot. Mag., t. 8185, as acuminata.
- B. pruinosa is a fine Barberry, which was discovered in Yunnan by Delavay forty years ago, and came to this country by way of France soon after. It is a very robust shrub, and a plant at Wisley 9 feet high and 12 feet wide shows it at its best. In September it was freely set with the very glaucous, almost white berries, and in general appearance then much resembled aristata, but that species is deciduous or nearly so, and the berries are longer and aggregated in distinctly racemose clusters, whilst the inflorescences of pruinosa are fascicled or umbellate. Both of them require ample space.
- B. Veitchii.—Originally introduced from Hupeh to the Coombe Wood nursery by Wilson in 1900, this was distributed by Veitch's as "B. acuminata," a name it still bears at Wisley and in numerous other gardens. The name also occurs in this connexion in the earlier editions of my book on trees and shrubs, and that no doubt has helped to spread the error, which seems to have originated with Schneider himself as far back as 1908. "Acuminata" as a name has had a rather

unfortunate experience; the plant figured in the Bot. Mag., t. 8185, under the name by Dr. Stapf is really *Gagnepainii*. There is a fine plant of *Veitchii* at Wisley 7 feet high and 6 feet wide. It is evergreen, the young shoots are reddish, the lanceolate leaves are 3 to 6 inches long, and the pale yellow flowers come in clusters of four to eight. The berries are blue-black.

- B. Bergmanniae is represented at Wisley by a plant 10 feet high, which is evidently taller than Wilson found it in a wild state. He introduced it in 1908. It has hard-textured leaves, long stiff yellowish spines up to $1\frac{1}{3}$ inch long, flowers shortly stalked and crowded in clusters, succeeded by black, ovoid berries covered with blue-white bloom. A remarkable variety of it is acanthophylla, whose leaves are like those of a holly in shape and toothing and up to 2 inches long.
- B. Soulieana is closely related to Bergmanniae and has the same long, slender and abundant spines and black fruits covered with bluewhite bloom, but its leaves are narrower. A plant at Wisley is 7 feet high and as much wide. This species may still exist in some gardens as "B. sanguinea," under which name it was distributed by Lemoine of Nancy. I have no note of the true sanguinea at Wisley, but it belongs to the Wallichianae group, with replicata and Gagnepainii as its near neighbours. The name 'sanguinea' refers to the red flower-stalks and exterior of the flowers.

.Angulosae Section.

- B. angulosa.—This is the type species of Schneider's group Angulosae, which is represented at Wisley by at least four more. B. angulosa itself was one of Hooker's early introductions from Sikkim, where he found it in 1849. It is wild also in Nepal and Kashmir. Wisley has a shapely plant of rounded form, 4 feet high and 5 feet wide. It is very distinct in its often solitary flowers and berries, also in their large size. The Botanical Magazine depicts the former as $\frac{3}{4}$ inch wide and bright yellow, the latter as $\frac{1}{2}$ inch long, rounded obovoid and scarlet. The leaves before falling turn a rich glowing yellow and red, and in the matter of autumn colouring this Barberry ranks amongst the best. The branchlets are very angular and downy, the latter character being rather uncommon amongst deciduous Barberries. Akin to it is—
- B. circumserrata, the specimen of which came to Wisley from the Amold Arboretum in 1916. It is an upright shrub 3 feet or so high, with ribbed, reddish young shoots, obovate, often round-ended leaves and usually solitary flowers, but sometimes in twos or threes. The fruit is $\frac{5}{8}$ inch long, red, each one borne on a slender stalk $1\frac{1}{2}$ inch long. The leaves change to scarlet before falling, and this, with the unusually large berries, make it very handsome in autumn. In the same solitary-flowered group comes—
- B. dictyophylla.—This species, so well marked by the long white wands several feet long which it sends up from its base, is represented at Wisley by an exceptionally good form. Plants belonging

to this species vary a good deal in the degree of whiteness, and in the variety *epruinosa* it almost or quite disappears. In other respects *B. dictyophylla* is a handsome Barberry; its habit being graceful, its leaves small and glaucous beneath, its pale yellow flowers large and usually solitary, its berries red and ovoid. The leaves turn a good red before falling.

B. concinna, another of the Angulosae group, is one of the early introductions from the Himalaya and is a charming little deciduous shrub 3 or 4 feet high, of rounded shape. One of its more notable characters is the vivid whiteness of the under-surface of the leaves, which are obovate, about 1 inch long, edged with long spiny teeth. The nodding flowers are solitary, rich yellow, quite $\frac{1}{2}$ inch wide and globose; they are followed by fine, oblong fruits $\frac{1}{2}$ to $\frac{3}{4}$ inch long, bright red. Growing at altitudes up to 13,000 feet in Sikkim, it is quite hardy and is a useful Barberry for small gardens. There is a nice plant at Wisley standing close to the actual specimen of Wilsonae that was the seed parent of rubrostilla.

B. Tischleri, of which there is a small plant at Wisley, is the last of the Angulosae group to be mentioned. Eventually it will grow some 10 or 12 feet high. It is one of Wilson's introductions from Western China, is very hardy, grows freely, and produces its yellow flowers in racemes of four to ten blossoms. The oblong berries are $\frac{3}{8}$ inch long, red, at first covered with a thin glaucous bloom. A noticeable character is the prominence of the style persisting at the end of each berry.

Other species of the Angulosae group are diaphana, emulans and yunnanensis, all from Western China.

POLYANTHAE SECTION.

A group of Barberries to which Dr. Schneider has given the name *Polyanthae* has come greatly into prominence in recent years through the exploration of Central and Western China. The group apparently consists entirely of species from that region. It is extremely well represented at Wisley, and the collection there affords admirable facilities for its study. The most important species of the group is *B. Wilsonae*, now become very popular in gardens; and to it belong also *B. Stapfiana* and *B. subcaulialata* (both now reduced by Schneider to varieties of *Wilsonae*), *B. aggregrata* and its var. *Prattii*, and *B. polyantha* itself. But more important than any of these from a purely horticultural point of view are the numerous hybrids to which the group has given rise, and in the production of which Wisley has taken the most prominent part.

B. Wilsonae is distinguishable from Stapfiana and subcaulialata by the minute down on its young shoots, so minute, however, that it requires a fairly strong lens to detect it; Stapfiana is the most spiny of the three and perhaps the tallest; subcaulialata is more distinct in its larger leaves, glaucous beneath, and in its strongly angled young shoots. All three have toothless leaves.

B. aggregrata and B. polyantha (fig. 166) differ from the Wilsonae set in having frequently toothed leaves and they are distinct from each other in the size and length of the panicles. In aggregrata, which is now carrying abundant berries at Wisley, the panicles are very short, often less than I inch, so that a fruit-bearing branch has the berries closely set against it. In polyantha, on the other hand, the panicles are 3 to 4 inches long and hang free. B. Prattii, now regarded by Schneider as a variety of aggregrata, is intermediate between that species and polyantha.

In this group comes also *B. brevipaniculata*, and there is a fine plant so called, 10 feet high and wide, at Wisley. Writing some five or six years ago, Schneider says that the *brevipaniculata* of catalogues is always *Prattii*, and that the true thing was not in cultivation.

Turning to the hybrids, one's recollections immediately call up the $B. \times rubrostilla$, as shown from Wisley at Vincent Square in November 1916. It was awarded a First-class Certificate. This was the first of the hybrids to attract public notice, and I do not know that its beauty has ever been excelled by later hybrids. It was raised from a plant of Wilsonae crossed, it has been assumed, by insect agency with aggregrata. I cannot quite see how this parentage would explain the size and shape of the fruits of rubrostilla. In both species the berries approach a globose shape, whereas in rubrostilla they are oblong-ovoid (often almost conical) and § inch long; they are also of a deeper coral red. Since the advent of rubrostilla many other hybrids of the same group have been raised at Wisley, and amongst those that have been named are 'Firefly,' 'Fireball,' 'Ferax,' 'Carminea,' and 'Coral.' So numerous are they now, however, that the authorities have ceased to give them names and the general name of Wisley hybrids is attached to the group. The original plant of rubrostilla is now about 8 feet high and wide.

SINENSES SECTION.

B. Thunbergii is by far the best known of the species belonging to this group, and it has spread very much in cultivation during recent years, a popularity mostly due to the beauty of its autumn colouring. No Barberry is finer in this respect or more reliable, the leaves turning to a beautiful scarlet. It is of dense close habit, usually wider than it is high, its obovate, entire leaves ½ to ¼ inch long. In my experience it is one of the least effective of Barberries as regards blossom, and although the berries are bright red, I have never seen them abundant enough to count for much. The species is very hardy and very popular in New England; when I was in Massachusetts, in 1910, I measured a bush 8 feet high and 15 feet across. The berries are probably more freely borne there than with us. There is, besides the type, a small-leaved variety at Wisley 5 to 6 feet wide, which may be the var. Dawsonii, named after, and perhaps raised by, Jackson Dawson, the first superintendent of the Arnold Arboretum.

B. virescens.—The chief attraction of this species, which was introduced from the Himalaya by Sir Joseph Hooker in 1849, is the good

red colour of its young stems in winter combined with a graceful open habit. A fine example at Wisley, 9 feet high and wide, shows the latter characteristic very happily. The flowers have no outstanding quality in comparison with other Barberries, and there is a curious variation or uncertainty in regard to the colour of the berries. Hooker, in the Bot. Mag., t. 7116, describes them as "red or black," and there are plants at Kew some with one, some the other. Schneider terms them "plum-red" and Rehder as "purple, bloomy." The berries at Wisley were not ripe on September 5, but Mr. Chittenden informed me that they were black or nearly black at maturity.

B. koreana.—The typical erect habit of this Barberry is well shown by a plant at Wisley. It grows 6 feet high and is marked by its angled reddish branchlets and its drooping racemes, 3 to 4 inches long, of bright red berries which remain longer in beauty than those of most Barberries. The autumnal colour also is good. It was introduced in 1905 from Korea where, thirteen years previously, the late J. H. Veitch had seen it extensively used for hedges.

TINCTORIAE SECTION.

The identity of the two large-growing Himalayan species, B. aristata and B. Chitria, has been very much confused. Hooker and other Indian botanists united them under aristata, but Dr. Schneider very properly restored Lindley's Chitria to specific rank. Further, to complicate matters, the late Dr. Stapf in the Bot. Mag., t. 9102, claimed that the aristata of De Candolle and the Chitria of Lindley are the same plant and that, in consequence, the latter, as being the older name, takes precedence. What we have been growing for so long as aristata he gave a new name—glaucocarpa. I believe Dr. Schneider disagrees; at any rate I follow his determinations here as he is the greatest living authority on this difficult genus.

- B. aristata grows 10 or 12 feet high, is of wide-spreading growth, and one of the most impressive of Barberries. It is well distinguished from B. Chitria by its glabrous shoots turning grey the second season, by its shorter inflorescence being a raceme (not a panicle), and by the berries being covered with a white bloom. The copious, rich yellow racemes are very handsome in early summer.
- B. Chitria is represented at Wisley by several fine healthy bushes. One of them is 10 feet high and 15 feet wide, and is considered by the staff to be the most decorative, when in berry, of all the Barberries there. The leaves are up to three inches long, bright green above and below, and the panicles are six—on occasion as much as nine inches long, bearing very numerous flowers (fig. 167). The berry is longer and more slender than that of aristata, and much more thinly covered with bloom. The branchlets are finely downy when young, reddishbrown the second year.
- B. Jamesiana, which Sir W. WRIGHT SMITH has assigned to this section, is certainly one of the most attractive of the new Barberries

and succeeds excellently well at Wisley. Fruit-bearing sprays were exhibited from there, and given an Award of Merit at Vincent Square in October, 1925. It is a tall shrub, and there is at Wisley a fine plant 12 feet high, which is nearly twice as tall as Forrest usually found it in a wild state. It comes from Yunnan, and was introduced in 1913. In habit and foliage it resembles the vulgaris type of Barberry, but the young shoots are red and the leaves are larger, firmer, rounded and scarcely toothed. They turn a beautiful red in autumn. The flowers come in racemes 2 to 4 inches long, followed by clusters of red, globose berries, curiously transparent (fig. 168). Amongst deciduous shrubs this may be accounted one of Forrest's best introductions.

B. Beaniana was purchased for Kew at the Coombe Wood Nursery sale in 1913, and the plant so obtained was given this name by Schneider four years later. It is deciduous, of erect habit, up to 8 feet high; its leaves are 2 inches long, and its yellow flowers come in broad panicles followed by bright purple ellipsoid berries 3 inch long. Introduced from Szechwan by Wilson. Schneider, when describing it, stated that it was a very distinct species, whose taxonomic position was yet unknown. He has since associated it with aristata and Chitria in his Tinctoriae Section.

MAHONIA SECTION.

The common B. Aquifolium, one of the very best evergreens ever brought to this country for giving a dense ground-cover in shady places, is too well known to need mention here, and the same applies to B. Bealei, but Wisley has some rarer species of this, the pinnateleaved, section of the genus that should be mentioned.

- B. haematocarpa.—A healthy plant of this species is growing against the laboratory. Like its nearest allies, Nevinii, trifoliolata, and Swaseyi, it is distinguished from the older type of Mahonia by the hard-textured, grey, very spiny leaves. I do not know that the berries of haematocarpa have been developed in this country, but being blood-red, as the specific name implies, globose and \frac{1}{3} inch wide, they should be very handsome if borne in any quantity. Coming from the hot western and south-western parts of North America, it no doubt requires a place as sunny as that given to it at Wisley.
- B. Nevinii was originally found near Los Angeles in California. The leaves have usually five, but sometimes three or seven, leaflets. It first produced its bright yellow flowers in Britain under Mr. HAY's care in Hyde Park. So far as I have seen, its long slender shoots branch reluctantly, in consequence of which its habit is rather lanky. Prof. SARGENT considered it "handsome and distinct." It differs from haematocarpa in having black fruits. Probably best adapted for a sunny nook, where it should get to be 7 or 8 feet high.
- B. Fortunei is another Mahonia which I was surprised to find so healthy at Wisley. At Kew we have found it too tender to be creditably grown in the open air. Although I have perhaps never seen it at its best, I should judge that to be no great deprivation, for its foliage

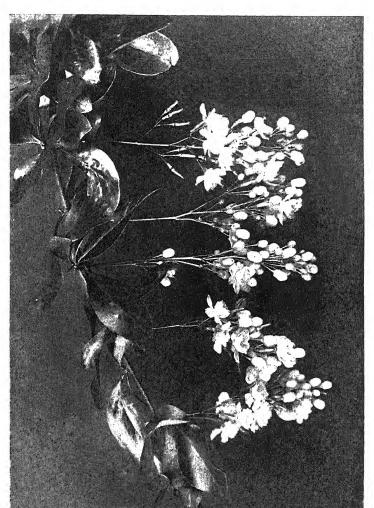


Fig. 167.—Berberis Chitria.



Fig. 168.—Berberis Jamesiana. (Reduced.)

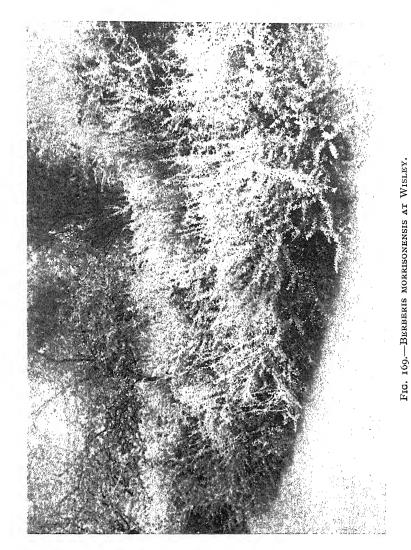


Fig. 170.—Berberis buxifolia on Rock-Garden, Wisley.

[To face p. 443.

is dull and the flowers are crowded on slender, erect, cylindrical racemes 3 or 4 inches long.

The following species of other sections have yet to be mentioned:

B. morrisonensis (fig. 169) is found on Mt. Morrison, in Formosa, at elevations of about 13,000 feet, whence it was originally introduced to this country by Mr. W. R. PRICE. It was again introduced by Wilson in 1918. As seen at Wisley, it is a shrub of graceful habit with leaves not more than 1½ inch long. The flowers are pale yellow, the fruits roundish ovoid and of a lovely translucent red. In the beauty of its autumnal colour it ranks high amongst Barberries, the leaves changing to brilliant tints of scarlet and gold.

B. hakeoides.—This curious Chilean species is represented at Wisley by several healthy plants 5 to 7 feet high. There used to be in the Coombe Wood Nursery an old stock plant of this species, introduced by Pearse, from which most, or all, of the older plants in gardens had originated. It and its progency were all of tall, rather lanky habit, but the plants at Wisley are quite bushy. The leaves are roundish, with spine-like spreading teeth, and vary from long-stalked to stalkless. The flowers are deep yellow, closely packed in clusters round the stems. I have not seen the berries, but they are described as blue-black.

B. montana.—During his Chilean journeys Comber sent home seeds of this species, a very beautiful and distinct Barberry. In my long experience I have seen and grown plants under the name, but I never saw the true thing until Comber introduced it. It is at Wisley but, as in other places, still small. It is deciduous and described as of graceful habit and up to 15 feet high in its wild state. The flowers come in clusters of two to four, each blossom $\frac{3}{4}$ inch in diameter, yellow and pale orange. The berry is lemon-shaped, black, covered with purple bloom. Another Chilean species,

B. empetrifolia, has already been mentioned as one of the parents of stenophylla. That perhaps is its chief claim to distinction, but it is very noticeable for its low-spreading mode of growth and its very narrow leaves. The deep yellow flowers come singly or in pairs at each joint, succeeded by blackish berries. Very hardy and suitable for a shelf in the rock garden.

B. buxifolia, the oldest of the South American species in gardens, having been introduced in 1826, is growing in the rock garden (fig. 170), as is also its variety nana. They are evergreen, except in very hard winters, and the type is of stiffish habit, the leaves hard-textured and not toothed. The flowers are solitary on their slender stalks and are followed by dark purple, globose berries. Var. nana is a neat dwarf bush, very compact, but in my experience very shy-flowering. B. buxifolia is not one of the best Barberries, but it is one of the earliest to bloom, sometimes in March. This and empetrifolia are placed by Schneider in his Buxifoliae Section.

PLANTS TO WHICH AWARDS HAVE BEEN MADE, 1934

Acanthophyllum spinosum. A.M. July 10, 1934. From Messrs. M. Prichard, Christchurch. An alpine plant closely resembling a Dianthus, with tufts of sharply-pointed, glaucous, linear leaves and small white flowers borne singly or in pairs on wiry stems.

Agapanthus africanus maximus. A.M. August 14, 1934. Messrs. M. Prichard, Christchurch. A robust variety of the wellknown African Lily. The stout scapes bear large umbels of 60 or more flowers. The petals are pale blue, darker at the margins and midribs.

Anchusa 'Morning Glory.' A.M. June 19, 1934. From Messrs. Wells, jun., Merstham. A very handsome hardy border plant. Flowers 13 inch across, bright phenyl blue when fully developed, tinged with violet when just opening; habit branching, very free flowering; height 5-51 feet.

Campanula Morettiana alba. A.M. June 19, 1934. From Dr. and Mrs. Fred Stoker, Loughton. P.C., 1933. A white-flowered variety of a rare and choice species which received A.M. on August 9, 1932.

Campanula Morettiana eximia. A.M. June 19, 1934. From Dr. and Mrs. Fred Stoker, Loughton. P.C., 1933. A very lovely plant with large, solitary, violet trumpets lifted on short stems from the clusters of grey-hairy, cordate leaves.

Carnation 'Allwood's Purity.' A.M. May 29, 1934. From Messrs. Allwood Bros., Haywards Heath. A vigorous, free-flowering variety, with long, stiff, erect stems and a strong calyx; flowers 4 inches diameter, full, pure white, sweetly scented, and of good substance; petals frilled.

Carnation 'Charming.' A.M. April 12, 1934. From Messrs. Allwood Bros., Haywards Heath. A moderately vigorous bushy variety with stiff erect stems and strong calvx; flowers rich salmon, centre shaded cerise.

Carnation 'Mrs. C. Wall.' A.M. June 12, 1934. From Mr. C. Wall, Bath. A good clear apricot hardy border variety. The flowers are of good form and are borne on very stiff stems.

Catalpa Duclouxii. A.M. June 19, 1934. From the Director, Royal Botanic Gardens, Kew. An uncommon Chinese species introduced in 1908 and believed to attain large dimensions. The leaves are ovate, rounded at the base, 5 to 7 inches long. The flowers are pale pink, spotted with pink and marked with orange in the throat, and are carried in few-flowered, flattish clusters.

Chrysanthemum maximum 'Phyllis Elliott.' A.M. July 10, 1934. From Messrs. C. Elliott, Stevenage. A very distinct hardy plant. Height 2½ feet; flowers 2½ inches across, semi-double, with very narrow white ray florets having a fringe-like appearance; plant well branched.

Clematis 'Huldine.' A.M. August 14, 1934. From Wm. Robinson, Esq., Gravetye Manor, East Grinstead. A beautiful late-flowering variety of *C. Viticella* type. It is vigorous and free-flowering. The flowers are of medium size, saucer-shaped. The six petals are broad, slightly reflexed at the tips, white flushed with lilac inside and of deeper colour barred with purplish-rose externally.

Crepis incana. A.M. June 26, 1934. From Mrs. Gwendolyn Anley, Woking. A pretty alpine Composite from Greece, suitable for the alpine house. The leaves are all radical, oblanceolate, toothed or lobed, and light grey-green in colour. The solitary flower-heads are pale pink.

Cyananthus Hayanus. A.M. June 19, 1934. From T. Hay, Esq., Hyde Park, London, W. A new species from Nepal, suitable for the alpine house or rock garden. The growths are prostrate, forming a low mat of small, hairy, coarsely-toothed leaves. The blue flowers are solitary and resemble small Campanulas.

Cyananthus pedunculatus crenatus. A.M. August 14, 1934. From T. Hay, Esq., Hyde Park, London, W. A good plant for the rock garden. In the specimen exhibited, the prostrate shoots formed a dense mat nearly 2 feet across, covered with small, linear, downy leaves. Numerous flowers are produced at the tips of short branches. They are tubular with reflexed petals of violet passing to blue in the throat.

Cytisus Battandieri. F.C.C. June 19, 1934. From T. Hay, Esq., Hyde Park, London, W. This species received the A.M. on June 16, 1931, and is described in the JOURNAL, vol. 57, p. 27.

Delphinium 'Blackbird.' A.M. June 26, 1934. From Chas. F. Hill, Esq., Westover, Harlington Road, Hillingdon. Spikes well clothed, side spikes strong; flowers semi-double, outer petals gentianblue, inner violet-purple, eye brown with yellow hairs.

Delphinium 'Lilian Bishop.' A.M. June 26, 1934. From F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. Spikes closely clothed, side spikes strong; flowers semi-double, outer petals cornflower-blue, inner cornflower-blue flushed soft pinkish-mauve, small white eye.

Delphinium 'W. B. Cranfield.' A.M. June 26, 1934. From Messrs. Blackmore & Langdon, Bath. Spikes large, pyramidal, with even and well-placed flowers, side spikes strong; flowers semi-double, flat, bright deep lilac-purple, tips of outer petals pale gentianblue, large white eye with cream hairs.

Delphinium 'Wrexham Glory.' A.M. June 29, 1934. From Messrs. Bakers, Codsall, Wolverhampton. Large spikes somewhat tapering with very few side spikes; flowers single, bright forget-menot blue, eye of medium size, pale brown, with pale yellow hairs.

Dierama pulcherrimum 'Skylark.' A.M. July 24, 1934. From Donard Nursery Co., Newcastle, Co. Down. A very handsome chance seedling with large, pendulous, purplish pansy-violet flowers.

Diplarrhena Moraea. A.M. June 26, 1934. From Collingwood Ingram, Esq., Benenden. An uncommon Tasmanian Irid, with grassy foliage and slender, erect scapes each of which produces a succession of flowers. The three outer segments of the perianth are pure white and spoon-shaped, the inner ones are smaller and attractively marked with lemon-yellow and lilac. Hardy in the open if planted near a wall.

Epilobium angustifolium, pink form. A.M. June 19, 1934. From G. D. Roper, Esq., Chard. A robust variety of the Rose-bay Willowherb bearing long racemes of pale pink flowers. A good plant for the wild garden or herbaceous border.

Eremurus 'Golden Torch.' A.M. June 19, 1934. From F. C. Stern, Esq., Highdown, Goring-by-Sea. A tall and robust seedling with massive spikes of rich, glowing, golden-yellow.

Erica umbellata. A.M. June 26, 1934. From Lord Aberconway, Bodnant. An attractive little species from South-West Europe. The specimen exhibited was about a foot high, and of compact shape. The small, linear leaves are mostly in whorls of 3, and the globular, rosy-purple flowers are freely borne on short lateral twigs. May, perhaps, require winter protection.

Eryngium alpinum 'James Ivory.' A.M. August 14, 1934. From James Ivory, Esq., Glenisla, Angus, Forfarshire. A robust herbaceous plant with large glossy foliage and sturdy flowering stems 3 feet high. The conical flower-heads are surrounded by large feathered bracts which are green beneath and dark violet-blue in their upper surfaces.

Gentiana cachemirica. A.M. July 10, 1934. From T. Hay, Esq., Hyde Park, London, W. A species of prostrate growth, forming a mat of purplish stems and oval leaves about half an inch long. The terminal flowers are tubular, the lobes bright blue, the tube white, striped with blue.

Gentiana \times 'Inez Weeks.' A.M. August 28, 1934. From A. G. Weeks, Esq., Limpsfield Common. A seedling from G. Veitchiorum \times G. hexa-Farreri, of similar habit to G. \times wealdensis. The flowers are pale blue, with white stripes radiating from the base.

Gentiana \times wealdensis. A.M. August 28, 1934. From A. G. Weeks, Esq., Limpsfield Common. An attractive hybrid raised from the cross G. Veitchiorum \times G. hexa-Farreri. The habit is similar to that of G. sino-ornata and the large flowers are well displayed. The colour is a beautiful rich blue, and the five lobes of the corolla show a tendency to reflex.

Hibiscus 'President.' A.M. July 24, 1934. From Lionel de Rothschild, Esq., Exbury. A spectacular greenhouse plant with erect stems and large, ovate, lobed and toothed leaves. The axillary flowers are 8 inches in diameter, with 5 large, satiny petals of rosypink, shot with a hint of orange near the margins.

Iris japonica, Ledger's variety. A.M. May 8, 1934. From F. C. Stern, Esq., Highdown, Goring-by-Sea. Large tufts of broad, dark green leaves; flower stems much branched, 2½ feet tall, flowers

 $2\frac{1}{4}$ inches diameter, short lived, pale lavender blotched darker, along the middle of the falls a white ridge crested with orange; a hardy variety.

Jasminum azoricum. A.M. August 14, 1934. From Mrs. Bucknall, Creagh Castle, Doneraile. An attractive climbing species for the cold house. The opposite, dark green leaves are ternate, and the ovate leaflets have prettily undulate margins. The starry, white flowers are very fragrant, and are carried in large, spreading, terminal panicles.

Lilium Brownii. A.M. July 10, 1934. From Dr. and Mrs. Fred Stoker, Loughton, and the Rt. Hon. Lord Swaythling, Southampton. One of the most handsome Lilies in cultivation. It is a sturdy plant with erect stems bearing numerous deep green, glossy leaves and several large, perfectly formed, trumpet-shaped flowers, white within and shaded externally with purple.

Lilium eandidum. F.C.C. July 10, 1934. From Dr. and Mrs. Fred Stoker, Loughton. The Madonna Lily is too well known to need description or praise. An unusually fine inflorescence, cut from a plant growing in partial shade, was exhibited.

Lilium cernuum. A.M. June 26, 1934. From Miss Amy Baring, Chandler's Ford, Hants., and C. P. Raffill, Esq., Kew. A graceful Korean species with slender stems 2 to 3 feet high clothed with numerous linear leaves. The flowers vary in number from 1 to 12, and have prettily reflexed segments of rosy mauve, lightly spotted with darker colour.

Lilium Davidi macranthum. A.M. July 24, 1934. From C. P. Raffill, Esq., Kew. A superior variety raised by continued selection from seedlings of the type. The flowers are of medium size, with recurving petals of bright orange, spotted with brown, borne in a large, branched inflorescence on a stem 5 or 6 feet high.

Lilium 'Fire King.' A.M. July 10, 1934. From J. E. H. Stooke, Esq., Hereford. This interesting hybrid also won the first prize in the competition at the Lily Exhibition on this day for the best new hybrid raised by an amateur. It originated from the cross L. umbellatum $\times L.$ Willcrovidii. The flowers are deep reddish-orange spotted with purple, and the perianth segments are broad and firm, reflexed at the tips.

Lilium giganteum. A.M. July 10, 1934. From the Rt. Hon. Lord Swaythling, Southampton. The exhibitor staged an imposing array of this stately Lily, with 10-foot stems clothed with large, glossy foliage and bearing shapely heads of pendent, white flowers.

Lilium \times princeps 'G. C. Creelman.' A.M. July 24, 1934. From Mr. W. A. Constable, Southborough. The parentage of this hybrid is stated to be L. Sargentiae \times L. regale. It is a tall and robust plant of deep green colouring. The flowers are much like those of L. regale, but the colouring on the outside of the buds and flowers is a somewhat dull purple. (See JOURNAL, R.H.S., 56, p. 69.)

Malpighia coccigera. A.M. July 24, 1934. From the Curator, Chelsea Physic Garden, Chelsea. A charming little evergreen shrub for the warm greenhouse. It is of erect and sturdy habit, well furnished with opposite, glossy leaves in shape recalling those of *Berberis Darwinii*. The very numerous flowers are blush-pink; each has four or five curiously stalked petals.

Mutisia decurrens, Comber's form. F.C.C. July 24, 1934. From Lord Aberconway, Bodnant. F.C.C. was awarded over seventy years ago to *Mutisia decurrens*, but the present plant is superior in the form and colour of its flowers to those usually met with. The ray florets are large and broad, and of a most vivid orange, shaded with scarlet. The leaves are lanceolate and possess apical tendrils.

Nymphaea 'Jupiter.' A.M. August 28, 1934. From Lionel de Rothschild, Esq., Exbury. A very handsome African Waterlily. The petals of the outer whorl are rich purple, the inner ones are narrower and shaded with blue. The centre of the flower is occupied by a cluster of stamens, yellow at the base, passing to purple at the tips. Tender.

Odontioda × 'Victor' var. 'Fire King.' A.M. June 26, 1934. From N. Prinsep, Esq., Pevensey ('Chantecler' × 'Victoria.') Medium-sized bright scarlet-red flowers.

Pæony 'Solange.' A.M. June 26, 1934. From Major G. Churcher, Lindfield. A large full flower of beautiful form, pale pink, flushed salmon, fading to almost white. A strong grower and a very regular and free bloomer. Raised by Messrs. Lemoine in France, 1907.

Phalaenopsis × Elisabethae. A.M. June 26, 1934. From Messrs. Armstrong & Brown, Tunbridge Wells. (amabilis × Rimestadiana.) An unusually large variety, the individual flowers being 5 inches in width.

Rhododendron rhabdotum. F.C.C. July 10, 1934. From Lionel de Rothschild, Esq., Exbury. This fine species received A.M. on September 8, 1931, and is described in the JOURNAL, vol. 57, p. 97.

Robinia hispida. A.M. June 19, 1934. From the Rt. Hon. Lord Swaythling, Southampton. A handsome deciduous shrub or small tree from the South-Eastern United States. The leaves are pinnate, with from 7 to 13 rounded leaflets. The large, rose-pink flowers are borne on short racemes. Sometimes grafted to form a standard, but in this form its brittle branches need protection against strong winds.

THE AWARD OF GARDEN MERIT.—XXVII*

By F. J. CHITTENDEN, F.L.S., V.M.H.

186. Rose 'Kirsten Poulsen'

Award of Garden Merit, September 18, 1933.

This rose is representative of a race raised by Messrs. Poulsen of Copenhagen and named after members of the raiser's family. They are comparatively newcomers and differ somewhat from the earlier dwarf Polyantha roses, being more vigorous in growth, more upright, and therefore taller, but like them they produce their flowers in large trusses and are in bloom almost continuously from June until autumn. They require the same treatment as the earlier race, that is, they are not very particular as regards soil, and require only so much pruning as will keep the bushes from being overcrowded. and as will remove some of the old wood that has flowered. Poulsen' was one of the first of this race and it made its début in 1922. In habit and in colouring (clear rose pink, tinged with carmine) it is similar and as floriferous as the earlier hybrid Polyantha 'Pink Delight' raised by Messrs. Laxton of Bedford, but that has single flowers while those of 'Else Poulsen' are semi-double. 'Kirsten Poulsen' is of similar habit but has single orange-crimson flowers and is an excellent rose for beds.

^{*} The notes on the first hundred plants to receive the Award of Garden Merit have been collected from our Journal, vols. 47 to 53, and published as a pamphlet, price is. For subsequent notes see vol. 54, pp. 218 and 423; 55, pp. 121 and 276; 56, pp. 80 and 245; 57, pp. 65 and 354; 58, pp. 171 and 400; and 59, pp. 131, 308, 360, and 406.

ANTIRRHINUM RUST: A PLEA.

The first authentic record of the rust disease of Antirrhinums in this country was made in July 1933, and notes on it appeared in our JOURNAL for February last (p. 119). It spread rapidly in south-east England by the autumn of 1933, and since then has spread still further, so that no part of England can be regarded as free from it. The rusted plants wither and look as though they had been scorched, so that many plans for bright beds have been frustrated. Only varieties and hybrids of Antirrhinum majus have so far been attacked, and all written here refers to these Antirrhinums only.

So serious is the menace of this disease against this popular plant, and so difficult would it be to replace it by another equally suitable for the purposes for which it is used, that we would urge most strongly that all our Fellows should take the only steps which seem at all likely to prevent its recurrence, and impress upon all their neighbours to do the same.

The importance of the plants in English gardens may be gauged by the fact that over a ton of seed of Antirrhinums is sold in England every year, and when one remembers that an ounce of this seed contains about 180,000, it will be seen that something like seven thousand million seeds of Antirrhinum are sown annually in this country.

A brief review of the facts seems desirable.

Until 1933 the disease was unknown outside N. America and Bermuda, where it has wrought havoc and proved difficult or impossible to control.

We do not know how it reached England, and all available evidence shows that infection is not carried on, in, or with the seed. No other plants are known to be attacked (save perhaps species of Linaria).

The fungus produces two forms of spore:

- (a) Short-lived spores with a maximum of six weeks' vitality (uredospores).
- (b) Spores capable of living for at least six months (teleutospores).

The uredospores are capable of immediate germination, and falling upon Antirrhinum foliage rapidly reproduce the disease. Infections have been seen to occur at practically all times in the year when the most favourable temperature (50° to 60° F.) occurs. At a higher temperature (68° and over) they germinate less readily. It therefore seems that high temperatures are not necessary for the propagation of this fungus.

The teleutospores germinate after a period and quite freely in winter, at a temperature of 50° to 60°, but less readily in spring. All attempts to reproduce the disease by the teleutospores directly have so far failed,

and if it is reproduced indirectly (as in many rust fungi) the steps are not known.

We must therefore suppose that the uredospores are the only means by which the disease is reproduced.

A plant bearing even the most minute patch of uredospores, which might easily pass unnoticed even by a keen eye searching a bed for the disease, is thus a potential centre from which infection may spread. It is a menace to all new plantings.

The one step, therefore, that seems likely, if taken, to prevent future attacks of the disease, is to destroy every plant of *Antirrhinum majus*, whether known to be infected or believed to be perfectly free, in all gardens, by fire by the end of November. Preserve no seedlings and no cuttings, but start afresh in 1935 by sowing fresh seed in pots cleansed with boiling water and crocked with similarly cleansed crocks in fresh soil, and prick out into clean boxes in fresh soil.

This method with a plant so easily raised as the Antirrhinum, and of which such good stocks of seed are now available, entails no hardship and no sacrifice. Between the end of November and the time for seed sowing at the beginning of March, a sufficient time will elapse to ensure the death of any stray uredospores, but if any plants are left alive through this period there is almost certainty that they will carry the disease over to the next year. Will all Fellows do their part and encourage all other gardeners to do the same? It seems the only way.

So-called immune varieties are at most only partially immune, and if absolute immunity in any plant is discovered it will take many years to ingraft that quality into the many varieties growers use. Spraying has in this country so far not given hope of success in dealing with the disease, and the most favourable reports from America show that only in certain weather conditions (which rarely occur here) does it prove at all successful.

Complete destruction of all Antirrhinums in all gardens everywhere this month will give us the best chance of avoiding the repetition of the disappointment that has come to so many in the present season.

F. J. CHITTENDEN.

GARDEN NOTES.

A New Double Thalictrum.—Newcomers to the genus Thalictrum are rare, and beyond Ladham's selected form of T. aquilegifolium purpureum and the white form of T. dipterocarpum nothing of note has been seen until quite recently.

A remarkable break occurred in the nurseries of Messrs. Hewitt of Solihull, in 1921. During the hot summer of that year a number of seedling *T. dipterocarpum* bloomed particularly well, attaining an average height of 5 feet. It was noticed that some did not possess the yellow filaments of the type, and on close examination it was discovered that there were five plants with individual flowers in the form of perfectly double rosettes and of an attractive violet-amethyst shade.

In the years that followed all attempts to induce the double form to seed proved unavailing, and through a lack of understanding of its true character and requirements the five plants were nursed in pots under glass.

In 1929 the stock consisted of only twenty-five plants, and it was decided to plant these out in a prepared bed in order to obtain some idea of their vigour and the best method of propagation. It proved, when cultivated outdoors, to be a vigorous perennial and increased readily by division in spring when growth appeared. Pot cultivation appeared to limit vegetative propagation severely.

From spring, 1930, propagation was rapid, and by the spring of 1933 there were over four thousand vigorous plants.

There is little doubt that many failures in the growing of *T. diptero-carpum* have been due to planting too near the surface. Apart from this, however, it is not a robust grower and fails to do itself justice in many localities. The same cultural requirements apply to the double form. The site chosen may be either in the sun or in semi-shade away from the drip of trees. The soil should be prepared with liberal quantities of leaf mould and a little well-decayed stable manure. Inasmuch as the roots do not become active until early in the year there is no need to plant before January or February. When planting the roots should be placed about 4 inches deep and embedded in sand if the soil is at all heavy. Good drainage is important. In a lighter soil it is advisable to plant six inches below the surface.

During growth great benefit will be derived from a generous dressing of well-decayed leaf mould, and inasmuch as underground runners are of frequent occurrence great care should be taken in cleaning. For this operation a hand fork is preferable to the hoe.

Being liable to attacks of slugs and snails, it will be found advisable to use a soil furnigant as a means of protection.—G. A. Phillips.

Cyananthus integer.—Of the known species of this Asiatic genus there are now a considerable number in cultivation, and of these C. integer certainly ranks as one of the most desirable. In his "Revision of the Genus Cyananthus," Marquand * enumerates twenty-one species with several varieties, and places C. integer in affinity with C. microphyllus, with lanceolate leaves and calyx densely covered with fulvous hairs. It is remarkably free flowering and quickly develops when planted out into a large patch, as it has done on the Rock Garden at Wisley. It started to flower there in August and is in full beauty at the time of writing (mid-September) and still shows evidence of continuing to bloom for some time.

Seeds of this beautiful plant which had been collected on the Kumaon Hills of the United Provinces, at altitudes of from 8,000 to 14,000 feet, were kindly presented to Wisley by E. A. OSMASTON, Esq. The seed soon germinated freely, and quickly developed into sturdy young plants which, when placed in the position they now occupy, grew well, forming a dense ground cover with its wiry stem and foliage, the latter being dark green above and lighter beneath, with a covering of whitish hairs. The flowers on opening are dark blue, becoming rather lighter with age, with a ring of hairs in the throat of the rather wide tube. The largest flowers exceed an inch in diameter. When planted among the stones of the scree the foliage is both narrower and shorter, and usually of a lighter green, while growth is less vigorous. C. integer is figured in Royle's Ill. Himal. Bot. 7, p. 69, fig. 2. As a garden plant it may be recommended on account of its freedom of growth and the number of flowers it produces in late autumn.—R. L. Harrow.

Soil Experiments with Gentiana sino-ornata.—In continuation of the study of the influence of soil conditions on growth (see p. 251) thirty small rosettes of Gentiana sino-ornata were, amongst other species, planted on April 7, 1932, in each of four soils, namely, a sand and clay mixture, a heavy loam, a chalky soil, and coarse sand, all other conditions being the same. From planting, those in the loam grew vigorously, while those in chalk showed chlorosis, dwindled and all perished in a year. In coarse sand growth was slow and many plants died in the early autumn after the hot summers. A few plants survived in the sandy clay. Vigorous growth and profuse flowering occurred in the plants in the heavy loam. This species, therefore, will not tolerate much chalk, nor dry soils, but prefers a soil rich in water and humus.—M. A. H. Tincker.

Aerides Lawrenciae.—This and its near ally A. Sanderiana are, so far, the two finest Aerides known of the odoratum group—that section in which the spur is horn-shaped and curved to the front of the flower, the lip not being expanded, and with the mid-lobe so placed

^{*} Kew Bulletin of Miscellaneous Information, 1925, p. 241.

that an insect must depress the lip and with it the spur before it can gain access to the stigma, etc.

The habit is imposing, as the stem attains considerable height and the strap-shaped persistent leaves are 9 to 12 inches long, and glossy green. The arching racemes, much longer, carry numerous flowers, wax-like in texture, very fragrant and far larger than those of odoratum, which are surpassed not only in size but in colouring. A. Lawrenciae the hues are almost brilliant; the upper sepal, petals and larger lower sepals are white, passing into deep amethyst-purple. All are somewhat oval in outline, the lateral sepals broadly so. The spur is tipped with green, while the lip has the margins of its three divisions beautifully denticulated; the side lobes are whitish, and the mid-lobe follows the apices of the sepals in colour but is even more intense in hue. As though the whiteness of the side lobes was not of sufficient attraction, the amethyst of the mid-lobe often encroaches on their areas.

A native of the Philippines, the species has never been common, but Messrs. Sanders, the original importers, exhibited a plant at the R.H.S. meeting of September 11, and plants have recently been shown by Mr. H. P. Lawson of Knaphill.

Under cultivation a stove house is required throughout the year, a minimum of at least 60° F. being needed in the winter.

Apart from temperature no particular difficulties are met with. The usual compost given to Vandas and Aerides applies, and as plants become "leggy" the stems must be reduced by shortening basally and repotting in late spring.—E. Cooper.

BOOK REVIEWS.

"Plant Chimaeras and Graft Hybrids." By W. Neilson Jones. 8vo. viii + 136 pp. (Methuen, London, 1934.) 3s. 6d.

Those who have grown Cytisus Adami and have noted the not infrequent reversion of certain branches to the Common Laburnum and occasionally to the small-leaved Cytisus purpureus will be grateful to Professor Neilson Jones for having put together in the compass of a small well-illustrated book all that is now known about this and other graft-hybrids such as Crataego-mespilus, the Hawthorn-Medlar, Piro-cydonia, the Pear-Quince, and those more recently created experimentally by Winkler. By grafting the Nightshade on the Tomato, and vice versa, and then cutting across the region of union of stock and scion, he induced the formation of shoots which bore leaves and flowers intermediate in character between the two plants which had been grafted. These Winkler at first asserted to be graft-hybrids, i.e., hybrids formed by the union of two vegetative cells in the region of the graft. They have now been proved to be chimæras—that is, growths in which the tissues of the two constituents of the graft have remained distinct though closely associated. Actually, as Professor Baur had suggested, each of these chimæras consists of a core composed of tissues of the stock surrounded by a skin formed by one or two layers of cells belonging to the scion.

The evidence which has accumulated of late years in favour of Baur's interpretation of the graft-hybrids as periclinal chimæras is given in some detail by Professor Neilson Jones and their structure is elucidated by suitable and clear illustrations. The author also deals with the supposed influence of the stock on the scion propounded by Professor Daniel and discusses the more recent experiment of Kostoff concerning the possible transference of immunity to disease from stock to scion.

As is well known, Baur's chimæral hypothesis of graft-hybrids was largely based on his experiments with variegated forms of Pelargonium zonale, as a result of which he was able to show that the white-margined varieties consisted of a green core surrounded by a skin of two layers of cells derived from a parent containing no green colouring matter, a structural constitution to which he gave the name of "periclinal chimæra." Similarly the green-margined varieties have a colourless core surrounded by a green skin. Professor Neilson Jones explains this curious phenomenon fully and clearly and devotes a special chapter to the discussion of the more puzzling and anomalous chimæral types met with in Pelargonium zonale such as 'Freak of Nature,' 'Happy Thought,' 'Golden Brilliantissima,' and in Hydrangea hortensis nivalis and variegata, in some of which forms the chimæral structure is associated with sterility or with puzzling genetic constitutions. In connexion with 'Golden Brilliantissima' and genetic constitutions. In connexion with 'Golden Brilliantissima' and Hydrangea variegata he puts forward a new working hypothesis which seems to meet the difficulties so far encountered in attempts to explain their construction. The results of Bateson's investigations with root cuttings of some forms of Bouvardia and Pelargonium in which he obtained plants differing from those produced by stem cuttings, thus indicating a chimæral nature of the plants concerned, are dealt with by Professor Neilson Jones. His handy little volume contains information concerning a large number of interesting phenomena of plant life, which are really closely related though at first sight of very diverse nature. The author has managed to collect together and to arrange consecutively a vast amount of scattered information and presents it in a clear and readable form illustrated by useful diagrammatic figures. As will be seen from the above account it contains a great deal of information which will be of interest to horti-culturists with a scientific outlook. They should be familiar with the modern explanation of graft-hybrids and with the accumulating evidence that many familiar horticultural varieties of common plants possess a chimæral structure. A perusal of the clear account given by Professor Neilson Jones will be very helpful in obtaining a precise knowledge of these facts.

F. E. Weiss.

"The Garden Frame." By J. S. Dakers. 8vo. viii + 184 pp. (Cassell, London, 1934.) 2s. 6d.

This is a useful little book giving particulars of the uses to which frames may be put in the garden of the amateur. It gives instruction in such a way that a tyro may make use of it and as he gains experience will be able to grow many things successfully that the outdoor garden alone will debar him from. Perhaps a few of the things suggested for the frame such as *Primula pulverulenta* and *P. Florindae* are better in the open, but that the grower will soon learn, as he will learn that, for successful use too great attention cannot be paid to the texture and condition of the soil, to watering and, perhaps above all, to ventilation.

"Tomatoes and Cucumbers." By J. S. Dakers. 8vo. 156 pp. (Cassell, London, 1934.) Paper covers, 1s. 6d.

A carefully written book dealing with the cultivation of the plants in the open and under glass, illustrated so that cultural directions are made clear.

"The Gramineae: A Study of Cereal, Bamboo, and Grass." By Agnes Arber. 8vo. 480 pp., with 210 illustrations, coloured frontispiece. (University Press, Cambridge, 1934.) 3os. net.

Mrs. Arber in her Preface states that she has of the grass, as Coleridge had of the Rose tree, "a distinct thought," and asks, as she is continually conscious of this unanswered question, "What countless properties and goings-on of that plant are there, not included in my 'Thought'?" Mrs. Arber has treated grasses from her own point of view, expressing her own thoughts which have developed from her prolonged study of their morphology and development.

She opens her book with an historical treatment of the Cereals. Her

She opens her book with an historical treatment of the Cereals. Her material is gathered largely from other texts, including the old herbals; and reproductions of the plates from these adorn the text. The morphological aspect is prominent. The subsequent section deals with the Bamboos and their tree-like habit of growth. Mrs. Arber compares Bamboos with other grasses from the developmental standpoint, contrasting the growing regions of the Bamboos and other plants. Throughout this section there is scattered a profusion of delightful morphological illustrations clearly annotated and drawn by Mrs. Arber.

The later chapters deal with the different phases in the life-history of the Bamboos and Grasses. The chapters on the reproductive shoots are exceedingly clear and again well illustrated. The vegetative phase of the grasses forms a very interesting study, both for the gardener with his lawns and the pastural farmer, and for the pure botanist. Two chapters are devoted to the consideration of the vegetative growth of grasses, and attention is paid to the root structure of a large number of species. The important question of tillering is mentioned, but perhaps could have been further developed in conjunction with the cereal, where this method of branching plays such an important part in the success or failure of the well-known cultivated varieties.

The genetical side is not excluded. A discussion on the origin and genetical constitution of putative hybrids is given for Spartina and Maize, but the text is not overburdened with cytology.

Finally we have chapters dealing with the rhythmic developmental pattern exhibited by characteristic grasses. A parallelism in development and structure is traced out between different grasses and references made to their near allies.

The value of the book is enhanced by the taxonomic table showing the genera and their arrangement. The bibliography is a large one, and covers a wide range of species of interest both to the botanist and to the gardener. Throughout the text is free from irritating errors or typographical defects.

text is free from irritating errors or typographical defects.

This book, which "is only one of the numerous possible books for which the different grasses supply material," adequately reflects Mrs. Arber's outlook on the Gramineae, and is truly worthy to be dedicated to the memory of Dunkinfield H. Scott, as it presents a unique theme woven from the threads of prolonged and careful personal research on this important family of plants.

M. A. H. TINCKER.

"Life of Mendel." By Hugo Iltis. Translated by E. and C. Paul. 8vo. 336 pp. (Allen & Unwin, London, 1934.) 12s. 6d.

Of peasant stock, born in Heinzendorff, in Moravia, in 1822, Johann Mendel, later, when he became a member of the Augustinian Order, to be known as Gregor Johann Mendel, was destined to experiment and discover facts which when they came to light years after revolutionized the ideas of heredity then current and gave a tool into the hands of plant and animal breeders the possibilities of which are even now not thoroughly grasped.

Little was known of his early days, but painstaking search has revealed a considerable body of facts concerning his boyhood, his student days and the fruitful work of his early manhood; and what has been garnered is set out in an interesting manner.

The romantic story of the re-discovery by Correns, de Vries, and Tschermack in their several countries, of the facts he had demonstrated, is of course told and something of the influence exerted upon the course of scientific thought during the present century. Strangely enough there is no mention of the first translation of his paper on what we now call Mendelism, which was made for and printed in our Journal (vol. 26, p. 1) in 1901. That translation was the means of making known his lucid account of the behaviour of varieties of Peas when crossed and of the far-reaching conclusions he had drawn from them, and its study set afoot a vast amount of investigation which is even now bearing fruit.

This account of his life is a welcome one, and it illustrates again the marvellous results that may grow from beginnings the bearing of which may be

hidden, or almost hidden, from the mind in which they had their birth.

"My Garden Diary." By M. Haworth-Booth. 8vo. xv + 144 pp. (Murray, London, 1934.) 7s. 6d.

If a book describing the making of a herbacecus border in a particular garden can help others in the construction of such a border elsewhere, here is a helpful book. Mr. W. Robinson contributes a preface and the book is cast in the form of a monthly account of flowers the author has seen here and there in gardens—her own and other people's—and at Shows, with musings thereon. This fills the first eighty pages or so. The latter part is concerned entirely with the border, its plan and its plants. There is no Index.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Anoiganthus luteus Baker. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 539; April 1934).—This is described as a more graceful plant than A.breviflorus, usually flowering before the leaves appear; the orange flowers solitary or up to 3 on a scape. Native in Natal in sandy soil.—F. J. C.

Apodolirion MacOwanii Baker. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 533; April 1934).—Fruits hitherto unknown are now figured. They are orange cylindrical and nearly 3 inches in length, buried in the ground and with the aromatic odour of those of the nearly related Gethyllis. The white flowers have a tube about 3½ inches long and spreading rather narrow segments. The leaves are about half the length of the perianth tube at flowering time, and are spirally twisted. Found near Port Elizabeth.—F. J. C.

Argyroderma sp. By L. Bolus (S. Afr. Gardening, xxiv, p. 197; Aug. 1934; figs.).—Four new species of Argyroderma are described and illustrated, viz. A. Luckhoffii, dull yellow; A. aureum, golden yellow; A. angustipetalum, yellow; and A. Villetii, rose-pink.—F. J. C.

Brachystelma Galpinii N. E. Br. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 536; April 1934).—A curious but not showy plant allied to Ceropegia, but with a flattened corm about 3 inches in diameter and few lanceolate leaves on the branched stems.—F. J. C.

Brachystelma oianthum Schlechter. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 537; April 1934).—A curious contrast with the preceding, where the perianth tube is nearly absent. In this species it forms the conspicuous part of the flower, being almost globose and an inch long; whitish, with conspicuous black spots. F, T, C.

Chlorophytum rhodesianum. By S. P. Phillips (Flow. Pl. S. Afr., t. 540; April 1934).—Found near Bulawayo and nearly related to C. and ongense, from which it is distinguished by its long narrow leaves, undulate at the margin. Flowers greenish on a long branched inflorescence.— $F.\ J.\ C.$

Crinum crispum Phillips (Flow. Pl. S. Afr., t. 532; April 1934).—A new species related to C. longifolia, but with narrower, distinctly undulate leaves and distinctly compressed pedicels. Native of Transvaal, occurring plentifully near Pretoria. Flowers white or with pink markings on back of segments. The undulations of the leaves are absent or very faint in plants growing in shade.

Haemanthus sacculus Phillips (Flow. Pl. S. Afr., t. 531; April 1934).—A new species, differing from H. Lynesii in Bot. Mag., t. 8975, by its undulate leaves. The red flowers are arranged in a globose umbel about 5 inches in diameter on a 6-inch scape, appearing before the leaves. Native in Transvaal.—F. J. C.

Lobelia coronopifolia var. macularis Sond. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 538; April 1934).—Native of south coast of Natal, a plant with decumbent leafy stem, leaves about $1\frac{1}{4}$ to $1\frac{1}{2}$ inch long, toothed and ciliate, flower stems slender, 6 inches long, bearing 2 to 4 blue flowers, about the size of those of the bedding Lobelia.—F. J. G.

Wurmbea capensis var. purpurea Baker. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 534; April 1934).—A common species in south-west Cape Province, with a spike of dark blackish-purple flowers, each about an inch across. The narrow segments are coherent at the base and each bears a stamen on its face and is spurred below with a 3-lobed spur. Leaves linear-lanceolate.—F. J. C.

Wurmbea Kraussii Baker. By I. B. Pole Evans (Flow. Pl. S. Afr., t. 535; April 1934).—Native of Natal and East Griqualand. A species with broad perianth pieces and fewer flowers to the spike than the last.—F. J. C.

JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

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PLANTS OF NEPAL.

By T. HAY, M.V.O., V.M.H.

PRIOR to 1928 the literature on Nepal was very meagre, but in that year were published two handsome volumes entitled Nepal, by PERCIVAL LANDON (Constable, 1928). This talented author was given special privileges by the Nepal authorities, so that his work is the most authoritative and comprehensive account of Nepal that has yet appeared, but he died before his fascinating account of Nepal was through the press. The opening sentence of Chapter One stirs the imagination and creates an interest that is sustained throughout the whole work; this sentence reads: "Nepal remains the least-known country of either hemisphere."

Nepal is an independent kingdom and remains a closely sealed land and while Nepal prefers to remain secluded from other peoples this is not due to any foible but is a faith ingrained in every Nepalese. Landon says that the presence, even the look, of a stranger is to them fraught with evil influence, and intrusion into the woods, hills, rivers, temples and springs of Nepal is little less than sacrilege; all of them are instinct with a divine imminence that the Nepalese would not and perhaps could not explain to a foreigner.

The friendship and loyalty of Nepal to this country is proverbial and has been shown on many occasions; during the Great War Nepal provided many thousands of that incomparable fighting man, the Gurkha soldier; no fewer than two hundred thousand fought on all fronts and proved themselves second to none in courage and devotion.

Our interest is, however, in the plants of the country, and while it vol. Lix.

is to be expected that the flora of Nepal will correspond with that of the Himalaya generally, there is ample room within its boundaries for novelty and new species, as Nepal is five hundred miles long and one hundred miles wide. At present the published list of plants from Nepal is much smaller than that from many an English county.

The kingdom of Nepal extends for five hundred miles along the Himalaya, from the western extremity of Sikkim to the eastern border of Kumaon. There has been a British resident at Katmandu, the capital, since 1817. It appears that the first botanist to visit Nepal was Dr. Buchanan Hamilton; this was in 1802. His collections were made in the neighbouring mountains near the capital, and his plants were described by David Don in the Prodromus Florae Nepalensis, published in 1822, a small book of about two hundred and fifty pages and not difficult to procure. Incidentally it may be mentioned that this work of Don's is very scathingly referred to by Dr. Lindley in volume XI of the Botanical Register, p. 873.

The next botanist to visit Nepal was the celebrated Dr. Wallich, his visit being made in 1820 and, as in the case of all visitors, his activities were restricted to the valley of Katmandu and the sixteen-mile radius. Many of Wallich's specimens were brought to him at the capital by the pilgrims on their return journey from the temples and shrines of Gossain Than. Among the botanical specimens brought to Dr. Wallich were those of Gentiana ornata, seeds of which were not obtained until 1930, or one hundred and ten years after its discovery. In 1824 Wallich began the publication of his Tentamen Florae Nepalensis, but this publication only reached two parts containing fifty plates of Nepal plants, and it appears to be among the rarities of botanical literature.

The next noted traveller and botanist to visit Nepal was Dr. J. D. HOOKER. He entered the eastern end of Nepal by special permission in 1848 but as his visit took place during the winter the botanical results were limited by the weather experienced. An account of HOOKER's entry into Nepal is contained in his Himalayan Journals published in 1854, two most fascinating volumes on travel and exploration.

In 1876 Dr. John Scully collected in Nepal, and in 1907 Mr. I. H. Burkill visited Katmandu. Burkill states in his Notes from a Journey in Nepal, published in 1910, that he and Wallich, separated by a distance of eighty-seven years, gathered the same plants at the same spots.

It will be apparent that Nepal is still of great interest to the botanist and plant lover, and that the really serious botanical exploration of the country did not commence until the year 1928, when the late Prime Minister of Nepal selected Major Lall Dhwoj for the task of collecting seeds and specimens. As a young man, Major Lall Dhwoj had some botanical training in the Darjeeling Botanic Garden, and he had an eye for a good plant. In 1931 he died at his task and so did not live to receive the Gold Medal awarded to him by the Royal Horticultural Society. Our gardens are indebted to him for many fine plants; to his credit is

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point, as many specimens are of plants the seeds of which failed to germinate or have not yet been collected; these include a very magnificent Cremanthodium, perhaps the noblest of the genus; a lovely dwarf red-flowered Anemone, not far removed from A. narcissiflora; several very interesting Gentians and many Primulas; Thalictrums of unusual elegance in flower and foliage; Aconites of all heights and shades of blue; the fascinating Swertia multicaulis, and several dwarf Polygonums with rose-red and pink flowers much to be desired for the rock garden, and there are plants of many other genera still in Nepal that will delight and please the most critical.

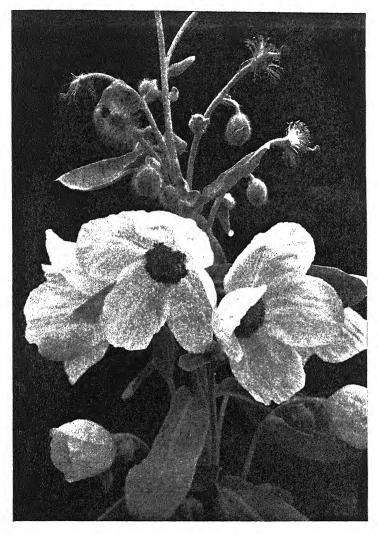


Fig. 171.—Meconopsis regia.



Fig. 172.—Meconopsis Dhwojii.

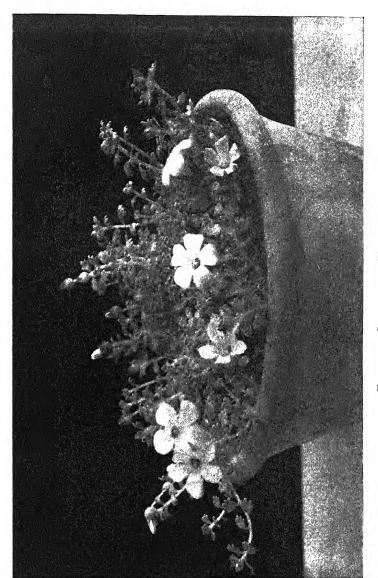


FIG. 173.—CYANANTHUS HAYANUS.

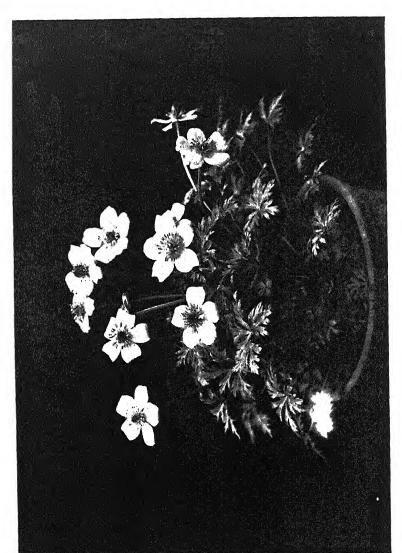


Fig. 174.—Trollius Gammeanus.

THE DEVELOPMENT OF THE DAHLIA.

By J. B. RIDING.

[Read September 11, 1934; Mr. D. B. Crane in the Chair.]

The Dahlia has been cultivated in this country since 1798, although through a clerical error in the Hortus Kewensis the date of its introduction was given as 1789, but some of you will recollect that the late Mr. Harman Payne went to considerable trouble to prove definitely that its introduction was ten years later. In any case, I recollect we celebrated its centenary at a Conference at the Crystal Palace ten years before it was due. During the first fifty years of its development it was regarded as a florists' flower, and the early raisers had but a single idea in their minds, which was to develop and perfect the double form of the flower which we know, and have known, for many years as the Show and Fancy flower. Any break away from the type was ruthlessly destroyed, and those old lovers of the Dahlia must have had the same seedlings from which have evolved the present-day types, and which have saved the Dahlia from oblivion.

I believe 'Springfield Rival,' introduced in 1840, was the first of the true show type as we know it to-day. The earliest Dahlia catalogue I have was issued on March 14, 1836, and contains 184 varieties. Of these not a single variety is in cultivation to-day, nor has been in my recollection although I can recollect most varieties during the past fifty-five years. There are no fewer than forty raiser's names which are given with each variety, and no firm is connected with the trade to-day, with one notable exception, Messrs. Sutton and Sons of Reading, who at that date were credited with two varieties, 'Sutton's Perfection 'and 'Sutton's Reading Purple.' The two oldest varieties we have in commerce to-day are 'John Bennett' and 'James Cocker'; the former came out in 1870, and the latter a year later. Sixty odd years after we find they are still two of the best show varieties, and both still have good constitutions. There have been hundreds of varieties put into commerce since which have long since passed into oblivion. The miniature form of the Show and Fancy types, known to us as 'Pompon,' was mostly developed in the 'eighties and 'nineties, and many varieties are well known to us to-day. The Cactus type came into being after the introduction of Dahlia Juarezii in 1879, and gave a great fillip to Dahlia cultivation of which it was sorely in need, for up to that period the Dahlia was practically in the hands of a few exhibitors, and could hardly be called a garden plant. There can be no doubt that the introduction of the Cactus type saved the situation, for from that period until the present day the evolution of the flower has been beyond conception.

I am afraid our raisers viewed the introduction too much from the old florists' point of view, for they commenced to improve the flower, so as to obtain the florets as narrow as possible, without any regard being paid to the habit of the plant or its stem, with the result that they produced very beautiful flowers with horribly weak stems, which were only useful for exhibition purposes, and of no earthly use to the garden as decorative plants. I take it the modern development and popularity of the Dahlia as we know it to-day commenced twenty years ago, when the Royal Horticultural Society and the National Dahlia Society held their first trial at Duffryn, near Cardiff, through the kindness of the late Mr. REGINALD CORY. This was the first trial held in this country where the varieties were judged solely as garden plants. This work has since been carried on by a Joint Committee in the Royal Horticultural Society's gardens at Wisley, and has done much to place the Dahlia on the pinnacle on which it rests to-day, while the parks throughout the country, and especially the Royal Parks in London, have done much to popularize the Dahlia as a garden flower, more especially in Hyde Park and Regent's Park, where the long borders are filled with every known type of the flower and are kept up to date as far as varieties are concerned.

The interest taken in the mixed borders can be seen at any time during their flowering season, but the beds planted with one variety excite but little interest and are passed with a casual glance. is no doubt about it, the public appreciate the mixed borders infinitely more than they do any so-called colour schemes. In the year 1836 there were no fewer than forty raiser's names mentioned, while at the present time I do not think we can count more than twenty. Ten years ago we had only about five in the whole country, and during the period when the Cactus section was so popular the British raisers had the field practically to themselves. Now since the advent of the more modern sections, we have varieties raised in practically every country in Europe, in the United States, Canada, Australia, South Africa, New Zealand and Japan, and as seedling raising is a very easy matter in some of those countries, it is not surprising that we have a perfect avalanche of novelties from all parts of the world every year, in addition to those from our own raisers. It becomes increasingly difficult to make a selection, especially as each raiser imagines his novelties are swans, whereas as a matter of fact the bulk of them are simply lame ducks. They may be new varieties but there is nothing novel about them: we simply have a procession of the same colours, nothing more or less. As an example take the number of white varieties in the Cactus section, the flowers are almost identical, though they do differ in habit and growth, but I feel certain the raisers could not pick out their own varieties from the flowers alone. Or, again, look at the vellow varieties in the large decorative section—to the ordinary layman they are just huge yellow flowers, and I doubt very much if any expert could name all of them correctly from the flowers alone. add to the difficulty, many of the American growers now offer Dahlia

seed, which is readily raised by amateurs, who come to the conclusion (because the knowledge they possess on the subject is limited) that they have a new variety and at once give it a name. It may be a new variety and utter rubbish at the same time. They do not realize the fact that one only gets a good seedling from some hundreds, perhaps thousands, of plants, and I am afraid this difficulty will increase enormously in the future, especially as there are so many seedlings being planted throughout this country, the majority of which appear to appeal to some as being better than anything they have seen before. They are then named and distributed, but very few of them make a name for themselves. Those who make a practice of looking through the seedlings which are placed before the Joint Dahlia Committee of the Royal Horticultural Society and National Dahlia Society at this season of the year will readily understand my remarks. It was a very wise idea on the part of the officials to separate the sheep from the goats, so now the varieties that have passed the first test are placed on the right-hand table on the dais, and the others are to be seen on the left. This saves considerable time on the part of the people who want to find a particular variety, but the acid test comes later when the plants are seen growing under natural conditions in the trial grounds at Wisley.

The evolution that has occurred in the flowers during the past thirty years led to some confusion in their classification, not only in this country but in other countries also. To remedy this state of affairs a Conference was called a short time ago, and under the skilful guidance of Mr. F. J. Chittenden, the R.H.S. Technical Adviser, a new classification arose which has been most helpful in defining the class to which new varieties should be relegated. Even now there are varieties which are what I term on the border line and difficult to define. The new classification has been published by the Royal Horticultural Society and National Dahlia Society and is of considerable value to all those who compile a catalogue, inasmuch as it embraces the ideas of other countries and does away with our insular views on this subject. I shall not weary you with the details of this classification except to say there are now eleven distinct divisions, and these are subdivided into many more.

There are fashions in Dahlias as there are in ladies' hats, though the former do not change as rapidly as the latter. At the present time the largest decorative section is the most popular. Perhaps the size has much to do with this, though I think their strong erect stems are an important factor. The Cactus section have been under a cloud for some years now, simply because the raisers merely thought of the actual flower and neglected the stem entirely, so they were practically useless as decorative garden plants. I am pleased to say the newer varieties are rapidly improving in this respect, and some of them are now good decorative plants, but having gained a bad name their recovery will be slow. We have been told for some time past that the decoratives are getting much too large, and everybody seems inclined

to the same opinion. At the same time there is no indication of anyone trying to reduce their size, either by breeding or growing. On the other hand the larger the flower the more popular does it become, while the medium-sized flowers, which are far more useful in the garden, are neglected.

The smaller types known as Small Pæony-flowered and Small Decorative-flowered or so-called 'Charm' varieties are certainly being more widely grown, and this is not a matter for surprise as they are ideal garden plants, being of good habit, with fine stems and very floriferous, while they are ideal for cut-flower purposes. I am not a lover of the single Dahlias, at least of the exhibition type, as they are not particularly free-flowering, and if the seed pods are left to develop even for only a short period they cease to flower and will not do so again that season. The small Cactus varieties will also become popular when they are better known, as will also the small Semi-Cactus, for they are useful for almost any purpose. The Pompons in spite of their formal appearance are still great favourites with the public. Mignon section are planted in thousands, as may be seen all over the country; their one drawback is the necessity of removing the seed pods daily, for unless this is done they do not flower satisfactorily. time we shall have a section which produce double flowers, while still retaining their dwarf habit-we have a few examples already. The so-called Star varieties have not attained the popularity it was thought they would at one period, due I think to the necessity of removing their seed pods so frequently. At the same time they are an asset in any garden if they are only properly treated.

The last section I shall deal with are the so-called Orchid Dahlias. a name about as appropriate as the Cactus Dahlias and about as descriptive. The originator of this section named them Stella varieties and as such they are known all over the Continent. They are very light for decorative work, but unfortunately they do not flower sufficiently freely to make them popular.

Dahlias for Decorative Purposes.

It may seem strange when I state that the Dahlia has never been seriously entertained as a rival during its flowering season to such popular subjects as Roses and Carnations, though it has held premier position on the Continent for many years, as well as in the United States. I have always said, if the Dahlia is entitled to such a position all over Europe and parts of the United States, it was passing strange it should not be regarded as a cut flower of the first rank in this country, and was simply regarded and treated as a cheap flower for the hawker trade. I fear it was purely a question of giving a dog a bad name. We are said to be a very conservative nation, and we are as far as our retail florists are concerned, though I must confess they have moved far more rapidly during the past five years than I ever anticipated. I venture to suggest that Dahlias will in the near future be serious

rivals to all other flowers during the months of September and October. The prejudice against the Dahlia as a decorative flower is rapidly disappearing, just as it did in the case of the homely Marigold. Thirty years ago none would look at a Marigold, neither would they at a Dahlia, as a decorative flower. Now, shall I say in a more enlightened age, the homely Marigold is much seen for at least eight months in the year, while the Dahlia is rapidly coming into its own. I recollect the time, and not so very long ago either, when the only Dahlias to be seen in Covent Garden Market were short-stemmed varieties, bunched tightly together right up to their necks and sold for "any old price." Now they are boxed and packed just as carefully as Carnations or Roses, and it is quite evident that the public appreciate the fact, for only last week I was looking in a florist's shop in the City, and saw that I could buy good Carnations at 4s. a dozen, Roses at half the price, while the Dahlias were all marked at 5s. 9d. a dozen, and not very extraordinary at that. It has been said repeatedly that the Dahlia is useless to the florist for "making-up" purposes, but I invite those with such ideas to view the florist's establishment in Victoria Street, only a few hundred yards from where I am speaking, where they will see literally thousands of Dahlia blooms being used in all sorts of floral designs. This is surely sufficient evidence that the Dahlia can be used as a decorative flower just in the same way as any other popular flower, but it must be treated in a rational manner.

We are told the flowers droop so quickly after cutting they are useless for vase decoration, but this is all a matter of treatment. The flowers should be cut early in the morning, and placed deeply into water for two or three hours before they are put in vases or used for any other purpose, and every time the flowers are taken from the water the end of the stem should be re-cut. I have seen all sorts of methods employed to keep the flowers in good condition, from aspirins to Scotch whisky, to say nothing of dipping the stems in hot water, and bruising the stems with a hammer. Probably some of these "treatments" may answer very well under certain conditions, but in a general way the process of giving them a good soaking as soon as they are cut will answer the purpose quite as well as any of the other methods I have mentioned.

CULTIVATION.

The actual cultivation of the plants has altered little, if at all, during the past twenty or thirty years, beyond the fact that we are in more of a hurry now than we were in those days. Propagation is more rapid than formerly, mainly because amateurs, especially exhibitors, are now under the impression that the earlier they obtain their plants the better is their chance of being successful at the various exhibitions. A few years ago, amateurs were quite content if they secured their plants early in May, now they want them in March and April, which means they must be rooted early in February. I am not an advocate of these early plants, as the major portion become stunted and when

planted out are very slow in making new growth; no doubt where facilities can be provided in a greenhouse, and the plants potted on as they require it, there is something to be gained by it, though I am convinced these early plants are not usually successful. Cuttings rooted in March and April grow on without any check and are certainly more satisfactory. There is little to be gained by being in too much of a hurry, though that, I suppose, is a sign of the times in which we live.

For all practical purposes propagation is carried out by division of the old stools, or by means of cuttings. The old stools as a rule are earlier to flower, but they seem to become exhausted before the end of the season, whereas the plants propagated by cuttings last well ' throughout the season. The cuttings root as readily as Fuchsias, Heliotropes and similar plants, except that they do not like a close heavy atmosphere, for under such conditions the cuttings damp off very readily. The old roots should be started in March, and as soon as the eyes are half an inch long, so that you can see where you are cutting, the roots can be divided with a strong knife. These will be ready for planting in April, which is quite soon enough: they will make their appearance in May, and should there be any danger of frost the soil should be drawn over them just in the same way that you would protect a potato plant. Young plants should not be planted in a general way until the last week in May or early in June, except in very favoured districts where late frosts rarely appear. I do not propose going into the details of general cultivation as they are so well known, and they have not changed materially during the past twenty-five years. I must, however, mention the question of feeding. as this seems to be the most important item in the amateur's mind to-day. It is rarely one is asked, How should Dahlias be grown? The inevitable question is, How shall I feed my Dahlias? How the idea came about that Dahlias were such gluttons I cannot understand. As a matter of fact they require no more feeding than any other plant of a similar type. A large number of exhibitors actually spoil their stock through over-feeding the plants. I had a question a few months ago from an exhibitor who had made a concoction of salt, soot, lime and sheep droppings, and he proposed feeding his Dahlias with it; the point was he did not know how much to use. My advice I am afraid was more emphatic than polite. If only people would manure their ground exactly as they would for a crop of vegetables that would be ample for all their requirements, but in these days many people cannot obtain the farmyard manure or so-called natural manure. In such cases I should use bonemeal, which is always safe and reliable. A handful scattered in each station at planting time will be sufficient for a season. During the growing period the plants may be helped with any of the well-known general fertilizers, used according to instructions at fortnightly intervals. I should not use either sulphate of ammonia or nitrate of soda, as this usually results in soft growth. without any increase in the number or size of the flowers.

DISEASE IN THE DAHLIA.

Dahlias have been regarded for many years as practically immune from disease, but I am sorry to say this state of affairs no longer exists. During the past few years they have been attacked with a virus disease, which appears to be widely spread throughout the country. It is seen chiefly in the large flowering types, and more especially in those plants that bear the lighter shades of colour. At present there is no known preventive or remedy, and the only means of controlling it is by destroying, or rather burning, every plant that shows signs of infection. Its first appearance is noticed by a dwarfing in the growth of the plant, and a change in the colour of the flower: this we term "stunt." The plants will grow and bloom, though they are inferior to the normal plants. All such plants should be marked and destroyed when they are lifted and under no circumstances should they be used for propagating purposes. The smaller types of the plant do not appear to be affected as far as I have noticed. The first variety to be infected in this country was 'J. Van Tets,' a white variety which I discarded as a nuisance, though I believe it is still grown. 'Early Yellow' I also destroyed for the same reason. Dr. A. H. CAMPBELL of Bristol University tells us the disease is carried by insect agency, so it is important to keep the plants free from green-flies in their early stages; this should not give us much trouble, as they are so easily destroyed in greenhouses and elsewhere either by fumigation or spraying. At the present time I do not think serious damage is being done in this country, but unless we keep the disease in check one does not know what will happen in the future.

COMMON DISEASES OF THE ROSE.

By D. E. GREEN, M.Sc.

[Read October 25, 1932; Dr. W. F. Bewley in the Chair.]

Most of you already know that many rose diseases are caused by fungi microscopic in character. We can recognize many of these diseases by the symptoms shown by the plant. All the various signs shown on the foliage and on the stems cause one to realize that the plant is not in a good state of health. Weak and sickly plants succumb more easily to these diseases than healthy and robust plants. The best insurance against disease is good cultural conditions; keep the soil in good state and in good cultivation. Spraying should be secondary to good cultivation.

Fungi are spread by spores. The spore is equivalent to the seed of the higher plants, and it is by means of these spores that the fungus is able to spread so quickly and cause infection to healthy plants. The vegetative body of the fungus is composed of a mass of threads which bore their way into the plant; most of them work their way right in, but some are superficial, of which the best example is the rose mildew.

We can do much by gathering up the fallen leaves in the autumn and burning them, and by cutting out any dead or dying wood and burning that too. But when all these precautions have been taken there is still danger of spores from various sources finding their way to the plant, and against this danger spraying is often necessary.

Both dusting and spraying are used. Dusting is much favoured in America. but it has to be done in the early morning when the foliage is still damp. Spraying may be done at any time of the day when the weather is suitable, and in my opinion it is more thorough.

I should like to emphasize one point which I think is essential. A spreader must be added to the spray fluid. The rose foliage is rather difficult to cover thoroughly. The theory of spraying is to distribute a substance that is poisonous to the fungus and which will kill the spores or destroy the fungus just as germination commences, and so to cover the leaves with a protective cover that the spores which fall upon the leaves cannot injure the plant. At the same time this substance poisonous to the fungus must not do any harm to the rose tree.

It is rather astonishing when one looks through literature to see how little research has been devoted to the diseases of the rose. There is much being done in America and some of the results obtained there agree with some experimental results we had at Wisley in 1928.

The Rose Society has recently placed a grant with the Cheshunt

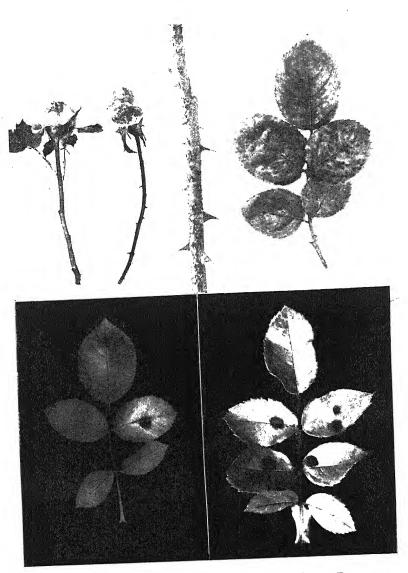


Fig. 175.—Black Spot of Roses due to Diplocarpon Rosae.

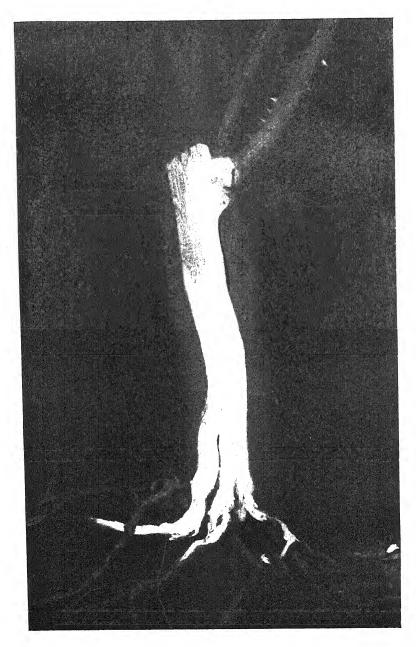


Fig. 176.—Graft Canker of Rose due to Coniothyrium rosarum. Stem split to show invasion by fungus.

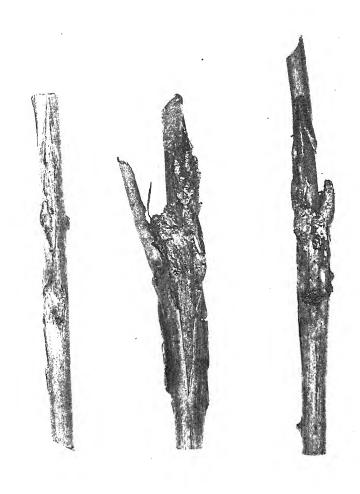


Fig. 177.—Stem Cankers of Rose due to Coniothyrium Fuckelii.

Fig. 178.—Chlorosis in Rose on left, showing almost White Leaves.

[To face p. 471.

Research Station for further investigation into rose diseases. That is a step in the right direction.

I take first the Rose Mildew—due to the fungus Sphaerotheca pannosa. I have taken this first because it is usually regarded as the most destructive fungus on roses in this country. It occurs on wild roses, as most of these rose diseases do, and it is very severe in some districts and often very bad in dry summers. Perhaps in a dry summer the roots are dry, and as the plant cannot get enough moisture the leaves flag, and are then more susceptible to the attack of the fungus. The white threads of the fungus make a film on the leaves: it also attacks the stems and the thorns and it causes a great amount of damage. The spores which spread to healthy plants are produced on these threads. On the leaves and stems the threads of the fungus run everywhere. They enter here and there into the cells by means of sucker-like organs and so absorb all the contents of the superficial cells. They do much damage by smothering the leaf as well as by killing the cells they enter. They keep on producing spores, they are multiplying all the time and all the white on the leaves and stems is composed of these threads. There is a very prolific production of spores; these fall on other leaves and a germ tube is produced from each spore. This grows along the leaf until it reaches a stoma which it enters to get nourishment, and soon the leaf is so severely attacked that premature defoliation takes place.

With this fungus repeated spraying is necessary. As in the case of all the other diseases spraying or dusting should be done before the disease appears. At Wisley dusting commenced in 1932 in June, but it did not keep mildew away. We propose to carry out some more experiments next year; this year they were preliminary tests. Although we started dusting in June the disease appeared in August and did considerable damage.

It was then decided to try spraying. The spray which we used and which can be recommended is lime sulphur, one in eighty, and at this strength it did not damage the foliage of any variety. A spreader such as saponin or calcium caseinate should be added. Remember to cover both surfaces of the leaves; it is little use spraying or dusting only the upper surface, you must try to cover the lower surface as well. There are many other remedies recommended for this disease, but it is not very clear which is the best. Soft soap in water is often used, so is carbolic acid, a dessertspoonful in a gallon of water. There is also dusting with green sulphur; this is finely ground and its colour prevents the rather objectionable appearance made by scattering flowers of sulphur over the rose beds.

The disease shown in fig. 175 is probably known to you all: it is Black Spot due to *Diplocarpon Rosae*, in which disease typical black spots appear on the leaves. This disease appears about mid-June at Wisley, and where it is severe bad defoliation occurs about August or even before in susceptible varieties. It is interesting to note that we have had defoliation by the first week in June on a severely infected

bush which was left unpruned. The photograph shows how quickly the fungus kills when a black spot appears on a leaf. Sometimes it forms distinctly round, black spots, but on other plants one sees a sort of diffused blackening roughly following the veins. That is another form of Black Spot. Both types sometimes appear on the same plant or even on the same leaf.

Black Spot generally attacks the foliage, but on some varieties it also attacks the wood and even the flowers. The photograph shows the wood attacked. The variety was 'Juliet,' which at Wisley is quite the worst variety for taking Black Spot. Although this fungus attacks the wood it is different from the mildew fungus, and the symptoms on the young wood are quite different, for Black Spot produces dark pustules on the bark.

The fungus ramifies through the cells and slowly forms a thick mat or cushion under the epidermis; this then begins to form spores which become so tightly packed that they push upwards. The cuticle is thus ruptured to produce a pustule. The spores are dispersed and each can grow a germ tube, so that wherever they fall on a leaf they can infect and produce more spores.

We have carried out experiments on Black Spot at Wisley, and found that heavy manuring did not reduce the disease. We gave heavy dressings of different artificial manures, but this had no effect in checking the disease, so we turned to ordinary manuring and spraying. We kept the bushes as healthy as we could with ordinary cultivation, choosing 'Juliet' as the most susceptible variety, because we thought if we could keep the disease in check on 'Juliet' we could do the same on any other variety.

We used several sprays and found Bordeaux to be the best, and of the many forms of it, the standard Bordeaux formula (4-4-50). You will find an account of it in the R.H.S. Journal for January 1931. We started on June 26, and sprayed six times at fortnightly intervals. Six sprayings may seem many, but according to the American reports they may spray twenty times in a season in America, so six times seems fairly reasonable. The disease could even then be seen on the leaves, but we take as our standard the fact that the leaves stayed on the plants until the beginning of November. This was something new for this variety, and the beneficial effect was seen the next spring. We pruned them in the following April, and when growth commenced the Bordeaux-sprayed row was much more vigorous and better looking than the others. Anyone who saw this Bordeaux-sprayed row would have said that they were extraordinarily good in comparison with the rest.

When spraying against Black Spot a spreader must be included to get a good covering of spray on the leaves, and I do not think you will find Bordeaux mixture causing injury to any variety.

The Black Spot fungus even attacks the flowers, and one photograph shows an attack on the petals of 'Juliet.' The spots are quite black and there is a reddish discoloration which should not be confused with

aphis damage or with damage by rain or sun. On the red and pink varieties rain-spot damage is rather common.

For some years we have taken observations, and a list of the varieties which at Wisley we considered somewhat resistant or somewhat susceptible to Black Spot was published in the JOURNAL for January 1932.

Rose Canker is caused by fungi of the genus Coniothyrium. Different species have been segregated, but their behaviour is very similar. They cause cankers at the junction of stock and scion, at the base, or anywhere on the shoots. We may divide them roughly into graft canker and stem canker (figs. 176 and 177). With the former the disease may have been transferred when the graft was made, and then the tree generally dies. Stem cankers appear on the branches and are very destructive, especially with unhealthy plants. If plants are kept in good health, cankers should be rare, and any that appear should be cut out at once. A purplish reddening of the bark is the first symptom, the patch turns brown or black and becomes wrinkled and cracked. Later on little shiny dots appear on it, the receptacles of the fungus which contain the spores. Graft canker often commences in the old snag left near the junction with the stock—such snags should be cut back smoothly and Stockholm tar put on when planting. If the trees are kept healthy this fungus, in my opinion, is not such a deadly parasite as sometimes it is said to be. All cankered wood should be burnt because this fungus is living in it, and even snags which are dead or dying, after cutting out should be gathered and burnt.

Stem canker of another type is the work of the same fungus Coniothyrium. The stem splits and shows a calloused and warty appearance, with rolling back of the bark. Such stems should be burnt. Bordeaux spraying would probably be of little use against this fungus, although it may be a protection for healthy shoots. More attention should be directed into enquiring into the health of the trees and the condition of the soil. When you are quite certain about that, remove all badly grafted trees, cut out all these cankers, and possibly give a Bordeaux spraying, which would render impotent any stray spores still remaining.

Another troublesome fungus is Rose Rust—Phragmidium mucronatum. This fungus has three kinds of spores. There are many rust fungi, and some of them live and produce different spores on different plants, so that the infection passes from one kind of plant to the other kind. In Rose Rust, from one point of view, it is fortunate that all the three types of spores appear only on the rose plant. That at least localizes them and we know where they are. It must not be forgotten that this disease also attacks wild roses.

This fungus appears in the spring on the stems, distorting them and forming bright yellow or orange-coloured patches of spores; these belong to the first type, the aecidiospores. In some years this first type is not common. The second type, the uredospores, usually appear on the under surfaces of the leaves in June as bright yellow or

orange pustules. The teleutospore is the third type, and they are usually seen about mid-August as black pustules on the under-surface of the leaves. Unhealthy bushes suffer severely, but really healthy bushes should not suffer very badly from this fungus. The teleutospore has a thick coat which turns a dark brown. This spore survives the winter so as to cause infection the following spring. That is why when dealing with this fungus it is important to gather up all the fallen leaves and burn them. With such methods, although you may not kill all the spores, you will kill many. The important part of the work in dealing with this fungus is the gathering up of the leaves and cutting out stems which bear the spring phase of the disease where this is severe; the ordinary Bordeaux spraying for Black Spot would keep this fungus down as well, but the general health of the tree should also be considered. This fungus should not cause any damage until very late in the season when the foliage is no longer of much importance.

The next disease differs from most rose diseases because it attacks such a large number of plants. The others have been purely rose diseases. Some attack wild roses and many kinds of rose species, but they are generally confined to roses. This disease, besides roses, attacks apples, pears, chrysanthemums, blackberries, plums, etc. is called Crown Gall and is due to the microbe known as Bacterium tumefaciens. It produces galls which vary greatly in size, ranging from the size of a pea to that of a golf ball, and on larger trees as big as a Sometimes the plant is attacked just above the ground football. level. I do not think this disease is of very serious consequence to roses, but in most instances where it has been serious the soil was very damp. It is very easily spread, because it can be carried on the hands and on the boots. Having that in mind, if a plant is seen to be bearing galls on the roots the best place for that plant is the fire. There is not much to say about the control of this disease except to warn you not to neglect the signs; if you discover galled roots that piece of ground should have a rest for a couple of years from roses and care must be taken not to injure the roots when planting new roses. bacterium is thought to be a wound parasite which is unable to enter except by means of a wound, so that when planting it is better to trim off any ragged piece of wood or root than to leave it. A clean cut is always preferable to a ragged piece of root; so try to avoid injuring the root or bruising the bark when planting.

The next disease is so far only reported from Wisley, and it is caused by the fungus Gnomonia Rubi. It attacked the ramblers and it was also found on wild roses and brambles. Generally a bud is affected and all the rest of that shoot above the bud dies off. The first sign is a discoloration of the bark; this gradually turns ashen grey and then wrinkles; little dots then appear which are the fruit bodies full of spores which can spread the disease. In the further stage the shoot cracks and fruit bodies with little protruding necks are seen. Affected shoots should be cut off well below the point of infection and burned; that will stop the trouble spreading to any great extent.

The next fungus is familiar to many people. It is called *Botrytis cinerea*. It lives on almost any dead or dying wood in the garden, and there are a tremendous number of strains of it. This fungus appears almost everywhere—for instance when unopened buds die they very soon become covered with the greyish-white felt of Botrytis. It is a saprophyte, which means that it lives on dead and dying things in the garden, but in a wet season it can become a nuisance. Under conditions favourable to it, it will spread from dead tissues to enter and kill living shoots. It is easily recognized by the greyish felt, which is composed of the sporing branches of the fungus, spreading up the stem; such a stem is doomed and it should be cut off below the attacked part and burnt.

Many shoots which one sees attacked by this fungus are very tender and very sappy. It is possible that if the plants were supplied with less nitrogenous manure or by better balanced manures—that is, more potash and superphosphate—they would not be attacked so easily by this sort of disease. Dead and dying wood should never be allowed to remain for any length of time to encourage the growth of such fungi. Even though a fungus is a saprophyte it can sometimes become parasitic and kill healthy shoots.

Fig. 178 shows another trouble about which we frequently receive complaints. It is called Chlorosis, and the typical condition of the leaves is that they turn yellow and in the end almost white, while still remaining on the tree. On the right of the photograph the leaves were a healthy green, while those shown on the left were almost white except for the veins. The green colour seems to linger longest in the veins. This trouble occurs mostly on chalky soils, but this year we have had it from all sorts of places. It is a disease which is not caused by a parasite, but is of physiological origin: the plant is unhealthy owing to some fault in the soil conditions. This trouble can be caused by faulty drainage, but it can also be caused by lack of some essential food element. It is well known that iron is required to form the green colour in plants, and plants must have a certain amount of iron from the soil, so that is one food element that may be lacking. On the other hand, the missing element may be magnesium, and it is a most difficult thing to tell by the appearance of affected plants what substance they lack. An excess of lime in the soil is often thought to affect other food elements and change their composition, so that they cannot be taken up by the plant, with the result that Chlorosis appears.

The usual treatment is to try the effect of supplying iron in the form of sulphate of iron. It can be spread around the plant, about an ounce to a plant in the form of crystals, and worked in, or it can be sprayed as a solution, when one ounce to six gallons of water is needed. Spray it on the foliage. Drainage of the rose bed must be all that it should be. Give the plants every chance to grow healthily. If that fails, send the foliage to be examined to make sure that it is Chlorosis.

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an unusual thing on roses-unless it can be corrected quickly a complete soil analysis will be necessary to find out what exactly is wrong with the soil.

There are three or four other minor diseases of roses I might very well mention, but I do not think they are important enough to merit any long discussion.

There is the one called the Downy Mildew-Peronospora sparsawhich sometimes causes browning of the leaves and defoliation of roses under glass. This brings me to the old remedy suggested for these troubles, especially these mildews—that is, to paint the pipes with a mixture of flowers of sulphur and lime and perhaps some soft soap. Make a good paint and paint the pipes; the sulphur is supposed to vaporize, and it is certainly a good method for keeping the greenhouse clear of mildews. This downy mildew disease requires expert advice because the fungus is somewhat difficult to detect. If premature defoliation and leaves dropping under glass occurs, this downy mildew may be suspected, but there is little to be seen on the leaves, just browning and leaf dropping. It is possible to control it by Bordeaux spraying or sulphur vaporization. One should, however, see that the roots are getting plenty of water.

There is another disease which is often seen in the garden—that is, a weakness in the flower stem, where the flower bud topples over. It is seen even in strong-growing varieties. This is either due to poor root action or general debility. There is every possibility where this occurs that the plants are needing phosphates and potash and bone meal; they are short of one or other of those foods, and it will help quite considerably if some of those artificial fertilizers are supplied.

Silver Leaf disease attacks roses, and sometimes the fruit bodies not being microscopic are seen on old dead wood. These bodies are easily recognized, being of a characteristic purplish colour. This is not a common disease on roses.

There are other troubles, such as bronzing, which is considered to be due to over-feeding; the colour is somewhat metallic and too much nitrogenous manure has made the shoots soft.

There are three or four other leaf-spotting fungi that often cause shot-holing in roses; little holes appear, but they do not often become serious enough to merit spraying or expense. I do not think they make much difference to the flowering or health of the rose tree.

A GREAT GARDENER-ARCHITECT.

By The Assistant Secretary, R.H.S.

THE holding of the Society's Great Autumn Show at the Crystal Palace seemed to provide a fitting occasion to do honour to the memory of the great gardener who designed that famous building—Sir Joseph Paxton. A collection of letters, pictures, books and other articles intimately connected with Sir Joseph was therefore brought together in one of the rooms at the Crystal Palace, and the interest which Fellows displayed in them has led to the writing of the following notes.

In 1822 our Society obtained from the sixth Duke of Devonshire the lease of 33 acres of land at Chiswick, and there the Society's gardens were established and continued until 1904, when they were transferred to Wisley. The gardens provided unequalled facilities for the training of young gardeners and keen young men were anxious to obtain employment there. Each entrant was required on his admission to write particulars of himself in a book of "Handwriting of Under Gardeners and Labourors," which is still preserved in our Library at Vincent Square, and that book contains the earliest account of Paxton's youth, for he was one of those who eagerly seized the opportunities available at Chiswick. His entry runs as follows:

"At the time of my entering in the Garden of the Horticultural Society my Father was dead. He was formely a Farmer at Milton Bryant in Bedfordshire, where I was born in the year 1801. At the age of 15 my attention was turned to Gardening, and I was 2 years employed in the Garden of Sir G. O. P. Turner, Bart., at Battlesden; from there I went to the Garden of Saml. Smith Esqr. at Woodhall, under Mr. Wm. Griffin, where I continued 3 years, and then returned to be Gardener to Sir G. O. P. Turner at Battlesden. I remained there 2 years, after which I came to the Garden of the Society, being then 22 years of Age and unmaried."

Now there is no doubt that PAXTON was born in 1803, and it will be noticed that he gave the date of his birth as 1801. Can it be that he thought that he would be more likely to secure admission if he gave his age as 22 instead of 20? However that may be, he acquitted himself well, and in the Society's Transactions he is mentioned as one of those who set an "excellent example" to other young gardeners. After a year's service he was promoted to be a foreman at a weekly wage of 18s. His duties included the making of descriptions of the numerous varieties of dahlias grown in the trials, and the training of climbers and other newly-introduced plants on the walls. While thus employed he attracted the attention of the Duke of Devonshire, who had a house near by, and when in 1826 the Duke needed a

a wage of 25s. and a cottage, to Paxton, who accepted it and subsequently described his departure from Chiswick in the following words:

"I left London by the Comet coach for Chesterfield and arrived at Chatsworth at half-past 4 o'clock in the morning of the 9th of May, 1826. As no person was to be seen at that early hour I got over the greenhouse gates by the old covered way, explored the pleasure grounds, and looked round the outside of the house. I then went down to the kitchen garden, scaled the outside wall, and saw the whole of the place, set the men to work at 6 o'clock, then returned to Chatsworth and got Thomas Weldon to play me the waterworks and afterwards went to breakfast with poor dear Mrs. Gregory and her niece; the latter fell in love with me and I with her, and thus completed my first morning's work at Chatsworth before o o'clock."

"Poor dear Mrs. Gregory" was the housekeeper at Chatsworth, and her niece was Miss Sarah Bown, whom PAXTON married in 1827.

Great changes soon took place in all departments of the gardens at Chatsworth, and they were so satisfactory to the Duke that in 1829 the care of the woods was also entrusted to PAXTON, who left no stone unturned in his efforts to make Chatsworth one of the outstanding gardens of the country. An arboretum occupying about 40 acres was formed and in a few years it contained 1,670 species and varieties. PAXTON prided himself on the fact that this fine improvement did "not cost His Grace sixpence; the plants having been purchased, the ground prepared, the trees planted and all other expenses paid with the produce of the trees cut down to make room for the walks and groups." Nor was he satisfied with the waterworks which he had inspected before breakfast on his first morning at Chatsworth, for he constructed a new fountain which threw its water to a height of 267 feet. Extensive glasshouses were built to house orchids and other new plants which were pouring into the country, largely as the result of the work of collectors sent out by our Society. Soon the Duke and Paxton decided that Chatsworth must have a collector of its own, and in 1835 John Gibson, one of Paxton's under-gardeners, was sent to collect plants in India, the Duke having determined to secure, among other plants, Amherstia nobilis, the vermilion-flowered tree which Dr. Wallich, the Director of the Calcutta Botanic Gardens, had described as a superb object "not surpassed in magnificence and elegance in any part of the world." GIBSON sent back to Chatsworth many plants and returned in 1837 with a large collection, including "upwards of 100 species of Orchideae, besides other fine plants." Among the latter were two plants of Amherstia, one for the Duke and the other addressed by Dr. Wallich to the Court of Directors of the East India Company. As luck would have it, the Duke's plant died on the voyage, while the other thrived. As soon as the vessel entered the English Channel Gibson dispatched a letter from Plymouth to Paxton suggesting that he should write to the Duke asking him to try to obtain the surviving plant. This PAXTON did, and one sentence of his letter

the Directors in the world shall never make me let go of it till it reaches Chatsworth." So to Chatsworth it went, and for some years it was the only specimen in Europe, though a rumour that another had found its way to a nursery in Chelsea caused Dr. Lindley, the Assistant Secretary of our Society, to write from our offices in Regent Street in a letter now the property of Messrs. James Smith & Sons of the Darley Dale Nurseries, Derbyshire: "No, No, No, My Lord, there is no Amherstia in King's Road. Your Grace was quite right in your opinion that the impostor is Brownea grandiceps. Instead of deriving his origin from the Temple Gardens of Buddha he has had no more dignified birthplace than the bush round a Demerara sugar plantation. I am so very happy to be able thus to assure you that your Amherstia is as yet the only Amherstia in Europe."

In the following year, 1838, the Duke succeeded Thomas Andrew KNIGHT as President of our Society, and he held that office until his death twenty years later. Not content with Gibson's collections from the East, the Duke and PAXTON dispatched two young Chatsworth gardeners named WALLACE and BANKS to see what they could find in the West, but their expedition to California ended in disaster, for they were drowned in the river Columbia. In the 'forties great interest was aroused among European gardeners by the description of a giant water-lily, native of the Amazon, with leaves 6 feet in diameter and flowers more than a foot across, which had been named, in honour of the Queen, Victoria regia. After many unsuccessful attempts, living seeds were at last introduced, and in the spring of 1849 some seedlings were raised at Kew. PAXTON promptly secured one of them for Chatsworth, and on November 14 of that year he had the honour to send to Her Majesty at Windsor the first flower of this remarkable plant produced in Europe.

It was of this water-lily that a few years later Paxton wrote: "It is to this plant that the Crystal Palace owes its direct origin."* In 1850 he was building at Chatsworth a glasshouse of peculiar construction for the growth of Victoria regia, and when it became known that the Royal Commission appointed to consider designs for the building which was to be erected in Hyde Park to house the Great Exhibition of 1851 had rejected all the designs submitted to them (about 240) he decided to submit one of his own based on the same principles as the Victoria regia house. His first rough sketch was made on a sheet of blotting paper as he sat at a board meeting of the Midland Railway Company at Derby. Through the courtesy of Mr. RIDGEWAY PAXTON and the Trustees of the Paxton Estate this blotting-paper sketch was included in the exhibition of Paxtoniana at the Great Autumn Show.

"In nine days from the time of making the blotting paper sketch," wrote PAXTON, "I found myself at Derby again with a roll of plans under my arm on my way to London. . . . I had the good fortune to accidentally meet Mr. Robert Stephenson" of railway fame at

^{*} This and other quotations which follow are from letters and other docu-

the station, and "on our journey to London I shewed the plans to Mr. Stephenson and got him to read the specifications. Mr. Stephenson expressed his unbounded admiration of the design and he promised me to lay the plans the next day before the Royal Commission, which promise he fulfilled." The next three weeks were a time of hopes and fears for Paxton, who wrote almost daily from London to his wife at Chatsworth. June 22: "Mr. Stephenson has helped me like a brother. . . . I go to Prince Albert at half past two to-day." June 24: "I have been with Prince Albert an hour to-day. . . . I believe nothing can stand against my plans. Everybody like them." July 6: "All is going on as right as possible for my plan. Everybody are for me. The only thing that can come now is expense which we hope to get over. . . . Robert Stephenson sticks to me like a brick." July 12: "Nothing settled yet. I believe we shall win but don't be certain. . . . I have made up my mind to a disappointment." July 13: "We are still in a state of uncertainty but I feel sure we shall win. . . . The Duke is most anxious for me to have it. He is almost wild about it." But at last the design was accepted, and on July 15 PAXTON wrote: "You will have heard by telegraph that my design has been adopted. The Duke is enchanted." At Chatsworth it was a red-letter day. "We are all," wrote Mrs. PAXTON, "in a state of great excitement at your most triumphant success. . . . The village bells have rung most merrily all day." In due course the Crystal Palace was erected in Hyde Park, and for his contribution to the success of the Great Exhibition PAXTON was knighted. When the Exhibition closed, with the help of a powerful company he superintended the re-erection of the building on the hill at Sydenham where it now stands.

From that time onwards Sir Joseph resided at Rockhills, adjoining the Crystal Palace, and followed the profession of an architect and civil engineer, though he did not relinquish his position at Chatsworth. In 1854 he entered the House of Commons as the Member for Coventry and held his seat until his death. He was a Fellow of the Linnean Society, a Vice-President of our Society, and a Knight of the Russian Order of St. Vladimir. Sir Joseph died on June 8, 1865. A memorial window was placed in the church at Milton Bryan by his widow, and a large marble bust provided by public subscription may be seen in the grounds of the Crystal Palace. In his will Sir Joseph bequeathed to the Royal Horticultural Society his copies of the Botanical Magazine, the Horticultural Register, Paxton's Botanical Dictionary. and one copy of any other works in his possession on botany and gardening, with the exception of his copies of the Gardeners' Chronicle, which he left to the seventh Duke of DEVONSHIRE with the request" that he will kindly allow them to be used by the young gardeners at Chatsworth."

PAXTON'S contributions to horticultural literature were numerous. He was one of the four founders of the Gardeners' Chronicle, which often contained articles and notes from his pen. He was author of The Cottager's Calendar, which went into several editions. Payton's

Botanical Dictionary, and The Cultivation of the Dahlia, a little work which was translated into French and German. He edited the Horticultural Register (1832–1836), and in co-operation with his friend Dr. Lindley he edited Paxton's Magazine of Gardening (1834–1849) and Paxton's Flower Garden (1850–1853). His literary activities also extended into other fields, for in 1845 he founded the Daily News.

As he himself repeatedly stated, Paxton owed not a little of his success in life to the kindness of the Duke of Devonshire, and the story of the romantic friendship which sprang up between the young gardener of humble origin and his aristocratic employer is about to be told by Sir Joseph's granddaughter, Miss Violet Markham (Mrs. James Carruthers), in a book to be published by Messrs. Hodder & Stoughton.

PLANTS TO WHICH AWARDS HAVE BEEN MADE.

Aconitum Wilsonii, Barker's variety. A.M. October 9, 1934. From Mr. Edwin J. Barker, Ipswich. A very handsome plant for the herbaceous border. The sturdy, branched growths reach a height of 6 or 7 feet and are amply furnished with deep green, lobed and toothed leaves. The large, lavender-blue flowers are carried in terminal and lateral racemes.

Anemone vitifolia. A.M. October 9, 1934. From T. Hay, Esq., V.M.H., Hyde Park, London. A useful, late-flowering herbaceous plant about 2 feet high. The large, lobed, radical leaves are rugose and almost glabrous. The flowers are small, white within and purplish externally.

*Aster novi-belgii 'Blue Jacket.' A.M. September 13, 1934. Raised and sent by Mr. E. Ballard, Colwall. Height 4 feet, flowers semi-double, 13-13 inch diameter, bright royal blue. Disc of medium

size, brownish.

*Aster novi-belgii 'May Storr.' A.M. September 13, 1934. Raised and sent by Mr. T. Bones, Cheshunt. Height 4 feet, flowers double, 13-2 inch diameter, pale pinkish-mauve.

Billbergia rhodocyanea. A.M. September 11, 1934. From Messrs. L. R. Russell, Richmond, Surrey. An interesting South American Bromeliad. The plant has about a dozen thick grey-green leaves overlapping below and recurved in the upper half. They are spinytoothed and transversely barred on the underside with silvery-green. The flowering stem and its conical, cymose inflorescence are densely clothed with spiny, flesh-pink bracts. The small flowers are at first pink, later bluish-mauve.

Bougainvillaea glabra 'Orange King.' A.M. October 9, 1934. From Messrs. L. R. Russell, Richmond. A very beautiful scandent shrub for the cool greenhouse. The glabrous leaves are 4 inches long, broadly ovate and acuminate. The inconspicuous flowers are borne in terminal panicles, and the large bracts which accompany them are bright orange-yellow when young, passing with age to pale rosy-lilac.

Brassolaeliocattleya × 'Stanley Dunn' var. 'Buttercup.' A.M. September 19, 1934. (B.-l.-c. \times J. M. Black $\times L.-c. \times$ Jean.) From M. L. Wells, Esq., Chiddingfold. Flower of medium size, of thick texture, clear canary-yellow.

Cattleya × 'Prince of Wales.' A.M. September 19, 1934. From Messrs. Sanders, St. Albans. ('Bletchley Prince' x 'Empress Frederick'). Rich mauve-purple, the wide labellum having a crimson tinge.

Ceanothus 'A. T. Johnson.' A.M. October 9, 1934. From Messrs. Burkwood & Skipwith, Kingston-on-Thames. A pretty variety with pale blue flowers in elliptical panicles 2 to 3 inches long. The deep green leaves are an inch long, ovate-lanceolate, with crenate, recurved margins.

Chrysanthemum 'Ace.' A.M. October 23, 1934. From Messrs. Cragg, Harrison & Cragg, Heston. A large-flowered bronze decorative variety with a prominent light yellow reverse. The flowers are loosely incurved and have very broad florets.

Chrysanthemum 'Bronze Précoce.' A.M. September 11, 1934. From Mr. T. Stevenson, Hillingdon. A reddish-bronze sport from the decorative Chrysanthemum 'Rose Précoce.'

Chrysanthemum 'Dainty.' A.M. October 23, 1934. From Mr. H. Shoesmith, Woking. A cream decorative variety flushed with pink and having a light yellow reverse. The florets are broad.

Chrysanthemum 'Empire.' A.M. October 9, 1934. From Mr. H. Shoesmith. A dark-red decorative variety with broad florets and a golden reverse. The central florets are recurved.

Chrysanthemum 'Gold Charm.' A.M. September 19, 1934. From Messrs. J. & T. Johnson, Tibshelf. A golden-yellow decorative variety with broad florets slightly incurving at the centre.

Chrysanthemum 'Gold Peak.' A.M. September II, 1934. From Messrs. J. & T. Johnson. A rich yellow decorative variety of medium size and good form.

Chrysanthemum 'Golden Lion.' A.M. October 23, 1934. From Mr. H. Shoesmith. A large deep golden-yellow decorative variety slightly incurved at the centre. The flowers are of good form and substance and have broad florets.

Chrysanthemum 'Grace Watson.' A.M. October 23, 1934. From Mr. A. L. Watson, Lenzie. A medium-sized pink incurved variety shaded with golden-yellow. The florets are inflated and blunt. A sport from 'Progress.'

Chrysanthemum 'Lucy Barrell.' A.M. October 23, 1934. From Mr. J. Barrell, Bridgwater. A flattish crimson-chestnut decorative variety with an old-gold reverse. The florets are broad and incurving at the centre of the flower.

Chrysanthemum 'Signal.' A.M. October 9, 1934. From Messrs. J. & T. Johnson. A decorative variety of good form with long narrow crimson florets having a golden reverse.

Chrysanthemum 'Sylvia.' A.M. October 9, 1934. From Mr. H. Shoesmith. A pale rosy-pink decorative variety with a light-yellow reverse to the young florets, which are recurved at the centre of the flower. The florets immediately around the centre have small yellow markings.

Corokia virgata. A.M. October 9, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. A small, evergreen shrub from New Zealand. The slender, interlacing twigs are at first white-tomentose and hear short-stalked. spathulate leaves & inch long, green above,

white beneath. The starry, yellow flowers are abundantly produced in spring and are followed by globose yellow, red-flushed berries.

Crocus Cambessedesii. A.M. October 23, 1934. From L. J. C. Southern, Esq., Great Missenden. A dainty species from Majorca and Minorca, suitable for pots in the alpine house. It produces a cluster of three or four linear leaves which are five inches long at flowering-time. The long-tubed flowers have narrow, elliptical segments an inch long, white within, and ivory, cleanly feathered with purplish brown externally.

Cupressus Lawsoniana Ellwoodii. A.M. September 19, 1934. From Mr. G. Ellwood, Southampton. A useful dwarf conifer of erect, columnar habit. The small, subulate leaves are somewhat glaucous.

Cyananthus integer. A.M. October 9, 1934. From the Director, R.H.S. Gardens, Wisley. A valuable autumn-flowering plant for the rock garden where it forms a close mat of slender, prostrate growths covered with small, narrow-ovate leaves. The numerous flowers are an inch across, tubular, with five blue-violet lobes and a tuft of white hairs in the throat (p. 453).

Fuchsia 'Mrs. Popple.' A.M. October 9, 1934. From Messrs. Clarence Elliott, Stevenage. A hardy variety with slender, arching growths clothed with dark-green, ovate leaves I to 2 inches long. The pendent flowers have coral-red sepals an inch long, and purple petals.

Gentiana sino-ornata × Veitchiorum (G. × stevenagensis). A.M. September II, 1934. From Mr. Frank Barker, Stevenage. From a central rosette of glossy, dark green, linear leaves arise spreading axillary shoots, each bearing several large flowers. The corolla has reflexed lobes of rich ultramarine shaded with violet. The inside of the tube is lightly striped.

Gladiolus 'Picardy.' A.M. September 11, 1934. From Major G. Churcher, Lindfield. A beautiful Canadian variety raised by Mr. Palmer. Flowers large, widely expanded, pale salmon-pink, lower segments cream suffused with salmon-pink. There are a few light purple lines in the throat.

Laeliocattleya \times 'Adonis' var. magnifica. A.M. September 19, 1934. (*L.-c.* \times *lustrissima* \times *L.-c.* \times 'Morvyth.') From Messrs. H. G. Alexander, Tetbury. Flowers well formed, sepals and petals rose-purple, labellum ruby-crimson, frilled at margin.

Laeliocattleya \times 'Angela.' A.M. October 9, 1934. From Messrs. McBean, Cooksbridge. ($C. \times$ 'Sibyl' $\times L.-c. \times$ 'President Wilson.') Sepals and petals orange-gold, labellum with a golden lip and red at apex and sides.

Laeliocattleya \times 'Bali.' A.M. October 9, 1934. From N. Prinsep, Esq., The Boxes, Pevensey. ($L.-c. \times$ 'Mrs. Medo' $\times C. \times$ 'Sibyl.') A distinct hybrid with thick-textured sepals and petals of buff-yellow and a round rich ruby-crimson labellum, the throat area having golden veining.

Laellocattleya × 'Berenice' var. 'Empress.' A.M. September 19, 1934. (L.-c. × 'Lustre' × L.-c. × 'Mme. Brasseur Hye.') From

Messrs. H. G. Alexander. Large flowers, sepals and petals rose, labellum crimson-purple.

Laeliocattleya \times Mysia. A.M. October 23, 1934. From Messrs. Charlesworth, Haywards Heath. ($L.-c. \times$ 'Senate' $\times L.-c. \times$ 'Sylph.') A pleasing flower of uncommon colouring. The sepals are salmon tinged with pink; the petals rosy pink with salmon shading; the labellum royal-purple with gold veining in the throat.

Milligania densiflora. A.M. September 19, 1934. From Lt.-Col. L. C. R. Messel, O.B.E., Handcross. An alpine plant collected by Mr. H. F. Comber in Tasmania (No. 2235). It is of tufted habit, with stiff, green, lanceolate leaves five inches long. The erect, branched scape is red and clothed with woolly hairs. The flowers are $\frac{1}{2}$ inch across, with six ivory-white petals flushed with rose at the base, and are borne in short racemes.

*Narcissus 'Agnes.' A.M. May 8, 1934, as a market flower for the open. Award given after trial at Kirton. Raised and sent by Mr. P. D. Williams, Lanarth, St. Keverne. This Poetaz variety (Division 8) received A.M. for garden decoration on April 25, 1930, after trial at Wisley. (See JOURNAL R.H.S. 57, p. 97.)

Narcissus 'Brunswick.' A.M. April 4, 1934, as a show flower. A well-formed Leedsii variety (Division 4a), with a flower about 4 inches wide, well poised on a stout 17-inch stem. Perianth segments pure white, broad, overlapping, smooth; trumpet shapely, about 2 length of segments, pale sulphur-yellow, becoming almost sulphur-white within. Raised by Mr. P. D. Williams, and shown by Messrs. Barr, Covent Garden, W.C. 2.

Narcissus 'Coverack Perfection.' A.M. April 4, 1934, as a show flower. A refined Incomparabilis variety (Division 2b), with a flower about 3½ inches across, well poised on a stout 18-inch stem. Perianth white, segments broad, overlapping and smooth, corona saucershaped with nearly half the spread of the perianth, very pale ochre at margin, passing to pale maize-yellow within. Raised by the Brodie of Brodie, shown by Mr. R. F. Calvert, Coverack.

*Narcissus 'Forerunner.' A.M. March 20, 1934, as a market variety for the open. From Mr. P. D. Williams, Lanarth. This yellow trumpet variety flowered in the Gulval trials from February 16, 1934, but in 1933 was much earlier. It received A.M. as a variety for cutting on March 11, 1930 (see JOURNAL R.H.S. 56, p. xlix). Raised by Rev. G. H. Engleheart.

Narcissus 'Fortune's Beauty.' A.M. March 20, 1934, as a variety for cutting. From Mr. R. F. Calvert, Coverack, Cornwall. An Incomparabilis variety (Division 2a) with a flower of medium size (3½ inches in diameter), well poised on a wiry stem of medium length and opening at about the same time as 'Fortune.' The perianth segments are broad and overlapping, though not very smooth, primroseyellow. The bright orange cadmium cup, about two-thirds the length

of the perianth segments and about half its spread, is rather ragged at the margin. Raised by the Brodie of Brodie.

*Narcissus 'Garibaldi.' A.M. May 8, 1934, for garden decoration. Award after trial at Kirton. An Incomparabilis variety (Division 2a), which received A.M. for cutting April 21, 1931 (see JOURNAL R.H.S. 57, p. xlv). Foliage spreading, flat; stem 14 inches; flower well poised; perianth 3½ inches diameter with very slightly overlapping yellow segments; corona ¾ inch deep, deep orange. Free-flowering, with an average of three flowers to the bulb, from April 23 to May 5. Raised by Mr. A. M. Wilson, sent by Messrs. J. R. Pearson of Lowdham.

*Narcissus 'Glorious.' A.M. May 8, 1934, for garden decoration and as a market flower for the open. Award given after trial at Kirton. Raised by Mr. J. C. Williams and sent by Mr. J. L. Richardson of Waterford. This Poetaz variety (Division 8) received H.C. for the same purposes April 8, 1927, after trial at Wisley. (See JOURNAL R.H.S. 53, p. 390.)

Narcissus 'Golden Frilled.' A.M. March 6, 1934, as a variety for pots. From Messrs. J. R. Pearson of Lowdham. An Incomparabilis variety (Division 2a) with flowers of medium size ($3\frac{1}{2}$ inches in diameter) borne on stout stems. The primrose-yellow perianth segments are broad and overlapping, and the chrome-yellow cup, which is almost as long as the segments, is deeply fringed. Raiser unknown.

*Narcissus 'Magnificence.' A.M. March 20, 1934, as a market variety for the open. Award after trial at Gulval. A trumpet variety (Division 1a). Vigorous, stem 16 inches long, flower well poised, perianth 4½ inches diameter, with deep golden, flat, slightly incurving segments, overlapping at base, trumpet 1¾ inch deep, 2¼ inches wide, expanded, frilled and slightly reflexed at mouth, deep chrome-yellow. Bulb large. Flowered at Gulval from February 27, 1934. Raised by the Rev. G. H. Engleheart, sent by Major A. A. Dorrien-Smith, Tresco, I. of Scilly. A.M. for garden decoration March 9, 1920, and for cutting on March 8, 1921.

*Narcissus Quiljon. A.M. May 8, 1934, for garden decoration. Award given after trial at Kirton. Foliage spreading, flat; stem carrying 2 or 3 well-poised flowers; perianth $2\frac{1}{4}$ inches diameter with slightly overlapping segments each $1\frac{1}{8} \times \frac{3}{4}$ inch; corona $\frac{1}{4}$ inch deep. Very free-flowering from May 6 to May 18, with an average of three stems to the bulb. Creamy white with pale green centre when just open. Raised and sent by Mr. E. H. C. Thurston, Chandler's Ford.

Narcissus 'Whiteley Gem.' A.M. February 20, 1934, as a market variety for forcing, and *A.M. March 20, 1934, after trial at Gulval as a market variety for the open. From Mr. R. F. Calvert. Flowered at Gulval from March 5 to April 12, 1934. This Incomparabilis variety (Division 2a) has received an A.M. as a show flower (see JOURNAL R.H.S. 55, p. lxviii) and as a variety for cutting (see JOURNAL R.H.S. 56, p. l). Raised by the Brodie of Brodie.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

March 7, 1933.

Sir WILLIAM LAWRENCE, Bt., V.M.H., in the Chair.

A lecture was given by Dr. P. L. Giuseppi on "Plant Hunting in Persia."

MARCH 21, 1933.

SEWELL MEDAL COMPETITIONS.

The Sewell Medal, for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house.

Amateur Grower's Medal.

To Mark Fenwick, Esq., Abbotswood, Stow-on-the-Wold, Glos.

Trade Grower's Medal.

To Messrs. Clarence Elliott, Stevenage. A lecture was given by Dr. F. W. Sansome, F.R.S.E., on "How New Plants are Brought About" (see vol. 58, p. 314). Chairman, Sìr Arthur W. Hill, K.C.M.G., F.R.S.

APRIL 4, 1933.

Mr. C. T. MUSGRAVE, V.M.H., in the Chair.

A lecture was given by the Hon. Henry McLaren, C.B.E., on "The Wisley Gardens."

APRIL 11, 1933.

DAFFODIL SHOW.

CHIEF AWARDS IN THE COMPETITIVE CLASSES.

The Engleheart Challenge Cup and a Silver-gilt Lindley Medal, for twelve varieties of Daffodils raised by the exhibitor.

To Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim. Silver-gilt Banksian Medal, for twelve varieties of Daffodils not in commerce. To Mr. J. L. Richardson, Prospect House, Waterford.

APRIL 25, 1933.

EARLY MARKET-GARDEN PRODUCE SHOW.

CHIEF AWARDS IN THE COMPETITIVE CLASSES.

Silver Cup for the most successful competitor.

To Mr. F. A. Secrett, Walton-on-Thames.

Silver Knightian Medal, for the competitor gaining the highest number of prize-points for salad vegetables.

To Mr. F. A. Secrett, Walton-on-Thames.

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PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Silver Knightian Medal, for the competitor gaining the highest number of prize-points for forced vegetables.

To Mr. F. A. Secrett, Walton-on-Thames. Silver Knightian Medal, for the competitor gaining the highest number of prize-points for outdoor-grown vegetables.

To Messrs. J. J. Barker, Southfleet.

Silver Banksian Medal, for the competitor gaining the highest number of prize-points for flowers.

To Mr. F. A. Secrett, Walton-on-Thames.

AWARDS MADE TO NON-COMPETITIVE EXHIBITS.

Gold Medal.

To Mr. F. A. Secrett, Walton-on-Thames, for vegetables and flowers in market packages.

Silver Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Knightian Medal.

To Messrs. Toogood, Southampton, for vegetables in market packages. A lecture was given by Mr. F. A. SECRETT on "Early Market-garden Produce." Chairman, Mr. H. V. TAYLOR, O.B.E., B.Sc.

MAY 9, 1933.

Mr. Wm. Cuthbertson, V.M.H., in the Chair.

A lecture was given by Mr. C. P. RAFFILL on "Seeds and Seed Raising."

CHELSEA SHOW.

MAY 24-26, 1933.

Held in the Grounds of the Royal Hospital, Chelsea.

The following accepted the Council's invitation to assist in judging the exhibits:-

ALEXANDER, H. G., V.M.H. Baker, G. P. Baker, W. G. DAKER, W. G.
BARNES, N. F., V.M.H.
BEAN, W. J., I.S.O., V.M.H.
BEDFORD, A.
BOWLES, E. A., M.A., F.L.S.,
F.R.E.S., V.M.H.
CAMPBELL, D.
CHRISTY, E. H.
CHURCHER Maior Crops Churcher, Major George. COATES, A. W. COOK, C. H. CORY, R., F.L.S. COUTTS, J. CRANFIELD, W. B., F.L.S. CRAWFORD & BALCARRES, The Rt. Hon. the Earl of, P.C., K.T. Curtis, C. H., F.L.S., V.M.H. DARLINGTON, H. R., M.A., F.L.S. DAWKINS, A. DE POUTRON, H. L. ELLWOOD, A. G. FARDEN, R. S. FENWICK, MARK. GALSWORTHY, F. HEADFORT, The Marquess of. INGAMELLS, D.

James, The Hon. Robert. JORDAN, F., V.M.H. McLeod, J. F., V.M.H. MAWSON, E. PRENTICE. METCALFE, A. W. Moore, Sir Frederick, M.A., F.L.S., V.M.H. Nash, John. NEEDHAM, C. W. PERKINS, H. PILKINGTON, G. L. Preston, F. G. Puddle, F. C. ROBINSON, G. W. ROGER-SMITH, Dr. H. ROTHSCHILD, LIONEL DE, O.B.E., V.M.H. SANDER, F. K. SHILL, J. E. Stevenson, J. B. Stevenson, T. Vasey, A. E. Want, T. Weston, J. G. White, A. W. Williams, Dr. A. H. WILLIAMS, C., M.P. WILSON, J.

LIST OF AWARDS.

The Sherwood Cup, for the most meritorious exhibit in the show. To Messrs. Sutton, Reading, for greenhouse plants from seeds. The Cain Cup, for the best exhibit shown by an amateur. To Lionel de Rothschild, Esq., Exbury (gr. Mr.A. Bedford), for Rhododendrons. The Orchid Challenge Cup, for the best group of Orchids shown by an amateur in a space not exceeding 60 square feet.

To C. G. Osborne, Esq., Marlow (gr. Mr. J. E. Jones).

The Sutton Vegetable Cup, for the best group of vegetables shown by an amateur.

To the Rt. Hon. Lord Riddell, Walton Heath (gr. Mr. A. Payne). Gold Medal.

To Messrs. R. Bolton, Birdbrook, for Sweet Peas.

To Lionel de Rothschild, Esq., Exbury, Southampton (gr. Mr. A. Bedford), for Rhododendrons.

To Dartington Hall, Ltd., Totnes, for rock garden. To Messrs. Armstrong & Brown, Tunbridge Wells, for Orchids. To Messrs. McBean, Cooksbridge, for Orchids.

To Messrs. Sander, St. Albans, for Orchids.

To Messrs. Charlesworth, Haywards Heath, for Orchids.

To Baron Bruno Schröder, Englefield Green (Orchid grower, Mr. J. E. Shill), for Orchids.

To L. de Rothschild, Esq., Exbury (Orchid grower, Mr. B. Hills), for Orchids.

To Messrs. Allwood, Haywards Heath, for Carnations and Pinks. To Messrs. Carters' Tested Seeds, Raynes Park, for florists' flowers.

To Messrs. Sutton, Reading, for greenhouse plants from seeds. To Messrs. R. Wallace, Tunbridge Wells, for a mixed group of Lilies and other bulbous plants, Rhododendrons and Azaleas.

To Messrs. Sutton, Reading, for vegetables.

Silver Cup.

To Messrs. Dobbie, Edinburgh, for Sweet Peas. To Messrs. W. C. Slocock, Woking, for Rhododendrons. To Mr. G. G. Whitelegg, Chislehurst, for rock garden. To Messrs. Clarence Elliott, Stevenage, for rock garden.

To Messrs. H. G. Alexander, Tetbury, for Orchids.

To Messrs. Alex. Dickson, Newtownards, for Roses. To Messrs. C. Engelmann, Saffron Walden, for Carnations.

To Mr. Amos Perry, Enfield, for mixed group of hardy ferns, herbaceous, bulbous and aquatic plants.

To Messrs. L. R. Russell, Richmond, for stove and greenhouse plants.
To Messrs. L. R. Russell, Richmond, for stove and greenhouse plants.
To Dartington Hall, Ltd., Totnes, for trees and shrubs.
To Messrs. L. R. Russell, Richmond, for trees and shrubs.

To Messrs. Fogwills, Guildford, for vegetables.

To Messrs. W. H. Gaze, Kingston-on-Thames, for garden. Silver-gilt Flora Medal.

To Orpington Nurseries Co., Orpington, for Irises.

To Messrs. J. Waterer, Sons & Crisp, Bagshot, for Rhododendrons and Japanese Maples.

To The Hocker Edge Gardens, Cranbrook, for rock garden.

To Messrs. Black & Flory, Slough, for Orchids. To Messrs. Stuart Low, Jarvis Brook, for Orchids. To Messrs. Barr, Covent Garden, for Tulips.

To Messrs. Frank Cant, Colchester, for Roses.

To Mr. E. J. Hicks, Hurst, for Roses. To Messrs. Ben R. Cant, Colchester, for Roses.

To Baron Bruno Schröder, Englefield Green (gr. Mr. E. J. Henderson), for Hippeastrums and Clerodendron fallax.

To Messrs. Hiller, Winchester, for trees and shrubs.

To Messrs. G. Jackman, Woking, for Clematis.
To Messrs. R. Veitch, Exeter, for trees and shrubs.
To The Yokohama Nursery Co., Kingsway, London, for mixed group of Japanese dwarf trees and Kurume Azaleas.

To Mr. T. M. Endean, Laindon, for Cacti and Succulents. To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

To Mr. James MacDonald, Harpenden, for grass garden. To The Knap Hill Nursery, Woking, for garden.

To Messrs. R. Wallace, Tunbridge Wells, for garden. Silver-gilt Banksian Medal.

To Messrs. G. Bunyard, Maidstone, for Irises.

To The Knap Hill Nursery, Woking, for Rhododendrons and Azaleas. To Messrs. W. E. T. Ingwersen, E. Grinstead, for rock garden. To Messrs. Pulham, Newman Street, London, for rock garden.

To Messrs. Dobbie, Edinburgh, for Tulips.

To Sir Jeremiah Colman, Bt., Reigate (Orchid grower, Mr. B. F. Perfect), for Orchids.

To F. J. Hanbury, Esq., East Grinstead (Orchid grower, Mr. S. Farnes), for

Orchids.

To Messrs. Keith Luxford, Sawbridgeworth, for Carnations.

To Messrs. Bees, Chester, for mixed group of herbaceous and rock-garden plants.

To Messrs. E. Webb, Stourbridge, for flowering plants from seeds.

To Messrs. Dobbie, Edinburgh, for Calceolarias.
To Messrs. H. J. Jones, Lewisham, for Hydrangeas.
To Messrs. John Peed, West Norwood, for greenhouse and stove plants.

To Messrs. I. Cheal, Crawley, for shrubs.

To The Donard Nursery, Newcastle, Co. Down, for trees and shrubs. To Messrs. The En-Tout-Cas Co., Syston, for Conifers. To Messrs. Hillier, Winchester, for trees and shrubs.

To Mr. R. C. Notcutt, Woodbridge, for trees and shrubs.

To Messrs. G. Reuthe, Keston, for mixed group of Rhododendrons and flowering shrubs.

To E. G. Theobald, Esq., Steyning (gr. Mr. R. Baker), for Cotyledons.

To Messrs. Bakers, Codsall, for Delphiniums, Lupins, and other herbaceous

To Mr. G. H. Dalrymple, Southampton, for Primulas and Meconopsis.

To Messrs. Oliver & Hunter, Moniaive, for Meconopsis, Primulas and other rock-garden plants.

To Messrs. M. Prichard, Christchurch, for rock-garden plants.

Silver-gilt Hogg Medal.

To Messrs. G. Bunyard, Maidstone, for Apples. To Messrs. Laxton, Bedford, for Strawberries.

Silver-gilt Knightian Medal.

- To The Rt. Hon. Lord Riddell, Tadworth (gr. Mr. A. Payne), for vegetables. Silver Flora Medal.
 - To Mr. G. G. Whitelegg, Chislehurst, for Azaleas.

To Mr. E. Dixon, Putney, for rock garden. To Messrs. Chaplin, Waltham Cross, for Roses.

To Lady Emsley Carr, Walton-on-Hill (gr. Mr. S. T. Doe), for Carnations.

To Messrs. Bakers, Codsall, for shrubs.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for trees and shrubs.

- To Mr. John Klinkert, Richmond, for Topiary.
 To Mr. W. J. Marchant, Wimborne, for trees and shrubs.
 To Messrs. D. Stewart, Wimborne, for Rhododendrons, Azaleas and other shrubs.
 - To Messrs. T. Yano, Portman Square, London, for Japanese dwarf trees.

To Messrs. S. Smith, Bush Hill Park, for Cacti and Succulents. To Messrs. Carter Page, London Wall, for Dahlias. To Messrs. C. Engelmann, Saffron Walden, for Zinnias.

- To Messrs. Hewitt, Solihull, for Delphiniums and other herbaceous plants.

- To Messrs. M. Prichard, Christchurch, for herbaceous plants.
 To Messrs. Wm. Wood, Taplow, for herbaceous plants.
 To Messrs. C. Engelmann, Saffron Walden, for Pansy garden.
 To Messrs. Casburn, Bedford & Page, Trumpington, for rock-garden plants.
 To Messrs. Hocker Edge Gardens, Cranbrook, for Alpine plants in pans.
- To Messrs. W. E. T. Ingwersen, East Grinstead, for rock-garden plants.
- To Messrs. J. Waterer, Sons & Crisp, Twyford, for rock-garden plants. To Mr. G. E. Welch, Cambridge, for rock-garden plants.

Silver Lindley Medal.

To Mr. W. Wells, jun., Merstham, for Lewisias.

Silver Banksian Medal.

To Messrs. Mansell & Hatcher, Rawdon, for Orchids.

- To Messrs. G. Prince, Longworth, for Roses. To Messrs. C. Engelmann, Saffron Walden, for Roses.
- To Mr. James Douglas, Gt. Bookham, for border Carnations.

To Messrs. Stuart Low, Enfield, for Carnations.

- To Messrs. Pennell, Lincoln, for mixed group of Clematis and Statice.
- To Messrs. Stuart Low, Enfield, for greenhouse shrubs and Hippeastrums. To Messrs. Chalcraft, Dorking, for Conifers and other trees and shrubs.
- To Messrs. Neale, Newhaven, for Cacti and Succulents.
- To Messrs. J. Waterer, Sons & Crisp, Bagshot, for garden. To Messrs. J. Cheal, Crawley, for formal garden. To Messrs. W. Artindale, Sheffield, for Eremurus.

To The Brookside Nurseries, Headington, for rock-garden plants. To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

Flora Medal.

To Messrs. H. Dixon, Wandsworth Common, for Orchids.

To Messrs. Allen, Norwich, for Roses.

To The Madresfield Gardens, Malvern, for Roses. To The Knap Hill Nursery, Woking, for shrubs.

To Mr. R. C. Notcutt, Woodbridge, for shrubs. To The Walton Park Nurseries, Walton-on-Thames, for Rhododendrons, Azaleas and other shrubs.

To Messrs. H. Freemantle, Berkeley Street, London, for formal garden.

To Messrs. J. Burley, Putney, for formal garden. To Mr. E. Dixon, Putney, for garden.

To Messrs. Bowell & Skarratt, Cheltenham, for rock-garden plants. To Messrs. Casburn, Bedford & Page, Trumpington, for trough gardens. To Messrs. Clarence Elliott, Stevenage, for rock-garden plants.

To Messrs. Gavin Jones, Letchworth, for rock-garden plants. To Messrs. Maxwell & Beale, Broadstone, for rock-garden plants. To Mr. G. P. Porter, Wimborne, for rock-garden plants.

To Messrs. J. Robinson, Eltham, for rock-garden plants. To Mr. W. Wells, jun., Merstham, for rock-garden plants. Banksian Medal.

To Messrs. Wm. Cutbush, Barnet, for Roses.

To Messrs. Hillier, Winchester, for Roses.

To E. R. Ashton, Esq., Tunbridge Wells (gr. Mr. C. V. Kent), for Orchids.

To C. G. Osborn, Esq., Marlow-on-Thames (gr. Mr. J. E. Jones), for Orchids. To Mr. J. C. Allgrove, Langley, for mixed group of trees, shrubs and herbaceous

plants. To Messrs. Barr, Covent Garden, for Irises, Hardy Cypripediums, and other

bulbous plants.

To Messrs. C. Engelmann, Saffron Walden, for mixed group of Cacti and Gerberas.

To Mr. Ernest Ladhams, Godalming, for mixed group of shrubs and herbaceous and rock-garden plants.

To the Rev. H. Rollo Meyer, Hertford (gr. Mr. J. P. Izzard), for mixed group

of Tulips and Irises.

To Messrs. H. Prins, Wisbech, for Tulips, Irises, Lilies, and other bulbous plants.

To Mr. G. H. Dalrymple, Bartley, for Auriculas. To Messrs. Neale, Newhaven, for Gazanias and Mesembryanthemums. To The Rolvenden Nurseries, Cranbrook, for Statice and Carnations.

To The Central Garden Supplies, Kenton, for dwarf Conifers.

To Messrs. H. Haskins, Bournemouth, for Clematis. To Messrs. Dickson & Robinson, Manchester, for bedding Begonias and Ageratum.

To Messrs. Dobbie, Edinburgh, for Dahlias.

To Mr. Stuart Ogg, Swanley, for Dahlias. To Messrs. Bakers, Codsall, for rock-garden plants. To Major L. H. Brammall, Bickley, for rock-garden plants.

To Messrs. Clark, Dover, for rock-garden plants.

To The Dorset Nurseries, Blandford, for rock-garden plants. To Messrs. Clarence Elliott, Stevenage, for trough gardens.

To Messrs. Hillier, Winchester, for rock-garden plants.

To Messrs. Kent, Brydon & Haigh, Darlington, for rock-garden plants. To Mr. H. G. Longford, Abingdon, for rock-garden plants.

To Mr. Amos Perry, Enfield, for rock-garden plants.

To Messrs. G. Reuthe, Keston, for rock-garden plants.

To Messrs. W. H. Rogers, Southampton, for rock-garden plants. To Messrs. Wm. Wood, Taplow, for rock-garden plants. To Mr. James Douglas, Gt. Bookham, for Auriculas.

Hogg Medal.

To Messrs. Stuart Low, Bush Hill Park, for Figs and Oranges.

Silver-gilt Grenfell Medal.

To Miss E. Macfarlane, Cintra Park, S.E. 19, for water-colour paintings of plants, chiefly Orchids. Silver Grenfell Medal.

To Miss M. I. Greenfield, Lindfield, for paintings and drawings of Orchids.

To Miss Anne Lawrence, Burford, for paintings of flowers.

To Miss D. Ratman, Victoria, S.W. 1, for water-colour paintings of flowers. To Mrs. A. C. Reeve-Fowkes, Eastbourne, for water-colour paintings of flowers. Grenfell Medal.

To Miss F. L. Bunyard, Rye, for paintings of flowers.

To Miss I. M. Charters, Leicester, for black-and-white drawings of plants and gardens.

To Mrs. V. G. Jeffery, Lee, for paintings of flowers. To Miss E. Savory, Chertsey, for flower paintings.

To Mr. A. G. Stubbs, Hove, for water-colour and black-and-white drawings of British wild and garden flowers.

To Miss G. Thomasset, Lee, for studies of plants, flowers and gardens.

JUNE 7, 1933.

SEWELL MEDAL COMPETITION.

The Sewell Medal for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house.

Amateur Grower's Medal.

To Dr. P. L. Giuseppi, Trevose, Felixstowe.

Trade Grower's Medal.

To Messrs. Clarence Elliott, Stevenage. A lecture was given by Mr. E. A. Bowles, M.A., F.L.S., F.R.E.S., V.M.H., on " Plants in Season."

Chairman, Mr. F. J. HANBURY, F.L.S., V.M.H.

JUNE 27, 1933.

AMATEURS' FLOWER SHOW.

CHIEF AWARDS.

Silver Cup to the most successful competitor in Division A. To Sir William Lawrence, Bt., V.M.H., Burford, nr. Dorking. Silver Cup to the most successful competitor in Division B. To Mrs. E. Wightman, Bengeo, Hertford. Silver Cup to the most successful competitor in Division C. To Mrs. G. Woodburn, The Lodge, Tendring, Clacton-on-Sea.

JULY 4, 1933.

Mr. THOMAS HAY, M.V.O., V.M.H., in the Chair.

A lecture was given by Sir William Lawrence, Bt., V.M.H., on "Award of Merit Plants.

JULY 11-14, 1933.

LILY CONFERENCE SHOW.

CHIEF AWARDS IN THE COMPETITIVE CLASSES FOR AMATEURS.

Silver Cup for the competitor gaining the highest number of prize-points in the competitive classes.

To J. E. H. Stooke, Esq., Danesmere, Hereford.

Silver Banksian Medal for the best hybrid.

To Major F. C. Stern, who exhibited Lilium × Maxwill.

AWARDS MADE TO EXHIBITS OF PAINTINGS.

Gold Grenfell Medal.

To Mr. Frank Galsworthy, Chertsey, for paintings of Lilies.

Silver Grenfell Medal.

To Lady Beatrix Stanley, Madras, for paintings of Lilies.

JULY 18, 1933.

CLAY CHALLENGE CUP COMPETITION.

The Clay Challenge Cup, which was offered for award for a new Rose possessing the true old rose scent, was awarded to Messrs. Dobbie, Edinburgh, for Rose Edina.

The first Masters Memorial Lecture was given by Professor V. H. Blackman, M.A., Sc.D., F.R.S., on "Plants in Relation to Light and Temperature" (see p. 1). Chairman, Sir John B. Farmer, M.A., LL.D., D.Sc., F.R.S.

JULY 19, 1933.

Professor Wm. B. Brierley, D.Sc., in the Chair.

The second Masters Memorial Lecture was given by Professor V. H. Blackman, M.A., Sc.D., F.R.S., on "Plants in Relation to Light and Temperature."

AUGUST 15, 1933.

FOREMARKE CHALLENGE CUP COMPETITION.

The Foremarke Challenge Cup, for twenty spikes of named Gladioli in not less than ten varieties, was awarded to Messrs. Dobbie & Co., Ltd., Edinburgh. A Silver Banksian Medal was awarded to Mr. E. R. Lynas, Redcar, who was placed second and a Banksian Medal was awarded to Mr. W. E. Phillips, Wood Green, who was placed third.

AUGUST 29, 1933.

AWARDS FOR EXHIBITS OF BRITISH GROWN BULBS.

Gold Medal

To Messrs. Seymour Cobley, Spalding, for Daffodil, Tulip, Hyacinth and other bulbs.

To The Spalding Bulb Growers' Association, for Daffodil, Hyacinth and other bulbs.

To Mr. R. D. Wellband, Spalding, for Tulip, Daffodil and other bulbs.

Silver-gilt Banksian Medal.

To Mr. G. Elsom, Spalding, for Hyacinth, Tulip, Daffodil and other bulbs. To Messrs. R. H. Bath, Wisbech, for Daffodil, Tulip, Hyacinth, Lily and other bulbs.

To Mr. G. H. Furness, Burnham, for Hyacinth bulbs.

Silver Lindley Medal.

To the Agricultural Institute and Experimental Station, Kirton, for educational exhibit dealing with bulb production.

Silver Banksian Medal.

To the Devon County Agricultural Committee, for Daffodil, Tulip and Iris bulbs.

To the Welsh Bulb Fields, St. Asaph, for Daffodil and Tulip bulbs. Banksian Medal.

To the Cornwall Education Committee, for Daffodil, Tulip and Iris bulbs. To Messrs. Daniels, Norwich, for Daffodil, Tulip, Hyacinth and other bulbs. To Messrs. J. R. Pearson, Lowdham, for Daffodil and Tulip bulbs.

SCIENTIFIC COMMITTEE.

March 7, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

eight other members present.

Redlings.—Mr. J. Fraser continued his exhibition of seedlings of British ors illustrating various families including Onagraceae, Verbenaceae, plants, illustrating various families including Onagraceae, Cucurbitaceae, Ericaceae, Scrophulariaceae, Polygonaceae and Chenopodiaceae.

Kalanchoë crenata.—Mr. E. G. Baker showed specimens of the plant grown as Kalanchoë crenata and of Verea crenata, the species upon which the true plant is founded. The latter had a racemose inflorescence in which it differed markedly from the plant now grown.

Crotalaria sp.—He also showed a Crotalaria with silvery leaves and large

yellow flowers from an altitude of 10,450 feet in Central Africa, which he regarded

as in all probability a new species.

Bellis cordifolia.—A specimen of this rare plant, collected in Spain by Colonel Enever Tod, figured in the Supplement to Willkomm's Flora, Plate 1., was shown by Mr. Bowles.

Albino Dactylis glomerata.--Miss Armitage of Dadnor, Ross, sent a specimen

of an albino form of Dactylis glomerata collected by her in Gloucestershire.

Lachenalia ovatifolia.—This Cape species, referred to the Committee from Floral Committee B for naming, was shown by Dame Alice Godman, who collected it there.

March 21, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, eight other members and Messrs. W. van de Weyer and G. P. Baker, visitors, present.

Anemone sp.—Mr. G. P. Baker showed again an Anemone (from Crete?) with

yellow flowers, the identity of which is not yet established.

Narcissus Watieri.—A fine pan of this small white-flowered species, collected and shown by Mr. G. P. Baker at an altitude of 9,000 feet in the High Atlas. It was recommended for a Botanical Certificate.

Primula floribunda isabellina × P. × kewensis.—Mr. Crane showed from the John Innes Horticultural Institution a cross raised between Primula floribunda isabellina and P. x kewensis. The flowers are paler yellow than those of P. x hewensis, and the hybrid breeds true to size and colour.

Hybrid Willows.—Mr. Fraser showed a form under the name of Salix alba ×

S. fragilis f. monstrosa, collected at Mickleham.

Seedlings.—He also showed a series of seedlings of British trees, comparing

the cotyledons and the foliage leaves.

Hybrid Narcissi.—Mr. van de Weyer showed Narcissus Bulbocodium citrinus × N. triandrus albus, N. Bulbocodium citrinus × N. Bulbocodium nivale, N. triandrus albus x N. Telamonius plenus, one seedling of which showed doubling in the flowers, and N. triandrus albus x N. triandrus concolor, which had, when selfed, produced a golden yellow N. triandrus.

Narcissus nanus × N. cyclamineus.—Dr. Collins, of the John Innes Horti-

cultural Institution, showed this hybrid, for which he proposed the name

 $N. \times mino-cyclam.$

April 4, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

four other members present.

Phaius grandifolius.—Mr. Hales showed an inflorescence of Phaius grandifolius with the terminal flower aberrant, having three lips and more than the normal number of other segments. This was referred to Mr. Worsdell.

Narcissi.—Mr. Bowles showed a number of seedlings of Narcissus Princeps from his garden, and drew attention to the likeness in form and coloration to the corresponding parts in the double variety known as 'Van Sion.'

April 25, 1933, Mr. A. D. Cotton, F.L.S., in the Chair, and six other members present.

Hormones and plant growth.-Dr. Tincker reported that the experiments he had made with the hormones of animal origin and their action on plants showed a very small increase in the rate of growth as a result of their application.

Danage by frost.—Mr. Hosking showed a series of plants to illustrate the

great amount of damage done by the frosts of the previous week.

Forms of Sorbus Aria.—Mr. Fraser showed a series of forms of Sorbus Aria from Hindhead, including a form with very small leaves from a place where the soil is very shallow. He was not certain whether this was a temporary condition induced by the poverty and shallowness of the soil or a seminal sport. Four trees similar in appearance occurred. One tree near the top of the hill had large leaves.

Breaking of Tulips.—A series of flowers of Tulips was shown from the John Innes Institution to illustrate the different effects of the virus of tulip-breaking

on different colour forms.

Aberrant Phaius.—Mr. Worsdell reported that the flower of Phaius grandifolius which was sent to him from the last meeting was a fasciated one representing three flowers in one.

May 9, 1933, Mr. A. D. Cotton, F.L.S., in the Chair, and six other members

present.

Azalea seedling variations.—Mr. Scrase Dickins sent shoots from seedlings of Rhododendron mucronatum var. sekidera with flowers of the variety for comparison. The variety has large white flowers with the dorsal sepal splashed and dotted rose, and no trace of yellow. The seedlings were mainly wholly white (as in R. ledifolium) or bright purplish-rose with rose dots and splashes on the dorsal petal; a few were like the parent; one was white with yellow markings corresponding to the rose of the parent.

Plants for naming.—A Discaria shown by Mr. Berkeley and stated to have been grown outdoors for twenty years in Worcestershire was referred to Mr. Cotton for naming. It proved to be D. discolor, a native of Chile and the

Argentine.

A blue-flowered form of Rosmarinus officinalis was shown by Mr. Collingwood Ingram, who had collected it in Corsica. It belonged to the variety angustissimus, and this appears to vary much in colour, for Mr. Ingram also collected a pinkish form.

A double white-flowered Scilla, apparently a large-flowered form of Scilla hispanica, was shown by Miss Willmott, in whose garden it has been growing for

many years.

Silver leaf in Ribes aureum.—Mr. Odell showed shoots of Ribes aureum affected with silver leaf and showing the typical brown spot in the stem characteristic (with the silvering of the foliage) of the attack of Stereum purpureum.

June 7, 1933, Mr. W. Hales, A.L.S., in the Chair, and three other members present.

Primula japonica aberrant.—Dr. Tincker showed a plant of Primula japonica from Wisley, without petals, and Lilium rubellum with its three outer perianth pieces almost green.

Epilobium Larrii.-Mr. Fraser showed Epilobium Larrii with rosettes of small leaves at the base and fruits with rosettes of leaves at base or apex and all seeds leafy. The last condition occurs at times in Cardamine and in Begonia.

Virescent Geum .- Mr. Bowles sent a Geum of the 'Mrs. Bradshaw' type, with many of the petals virescent though stamens and pistil were normal.

June 20, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and eight other members present.

Lathyrus odoratus. - Mr. E. G. Baker showed a dried plant of Lathyrus odoratus, collected in Sicily, near Girgenti, typical of the plant figured in the Botanical

Adonis aleppica.—He also showed a dried specimen of the fine Syrian species

of Adonis, A. aleppica, which rarely germinates well in this country.

Cyananthus for naming.—A species of Cyananthus collected by Captain F. K. Ward was sent for naming. It bore yellow flowers and agreed in all points with C. flavus.

Sorbus Aria forms.—Mr. Fraser showed dried specimens collected in Somerset of the conspicuous forms of Sorbus Aria called S. Aria lanifera and S. porrigens.

Iris "caudata."—Miss Eleanor Armitage sent a painting made by her sister of Iris minuta, and also of another Iris growing at Kew from seed received from Pruhonice under the name I. "caudata." This appears to be a name to which no description has been attached, and Miss Armitage sent a description of certain

Shoot enclosed in timber.—Mr. Bowles showed a piece of timber which had enclosed a cylindrical shoot rather more than an inch in diameter—no doubt the

result of growth of new wood around an old shoot.

Betula "Bhojpattra."—He also showed a long length of thin bark peeled from the trunk of this Birch, which Farrer sent home from W. China, which has red stems until the bark peels, when they are, at least for a time, creamy-tan.

July 4, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Monstrous Foxglove.-Dr. Tincker showed the well-known form of Foxglove with a peloric fasciated flower at the top of the spike. In the present instance

there appeared to be three whorls of carpels and possibly more.

Sorbus Aria forms.—Mr. Fraser showed dried specimens of a further series of forms of Sorbus Aria, including var. incisa from the N. Downs, var. hargarica from Clifton Downs, S. arranensis, S. fennica from Glen Catawl, and S. vestita from the Himalaya.

Genetics of Raspberries.—Mr. M. B. Crane showed raspberries to demonstrate the inheritance of colour in the fruit. He showed that there were two reds and two yellows. The prickles had no colour in either the yellow or the apricot form.

July 18, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

four other members present, and Mr. E. J. H. Corner, visitor.

Plantago major.-Mr. Fraser showed from Kew, a plant of Plantago major with a fruiting spike 28 inches in length including the stalk, and for contrast the form which he had collected on the bank of a chalk ditch, P. major var. intermedia with rosettes from 11 inch to 3 inches in diameter, and inflorescences only 2 inches in height.

Verbena venosa, etc.—Mr. Hanbury showed Verbena venosa and V. bonariensis

from his garden.

Plants for naming.—A plant from Messrs. Ladhams was recognized as Campanula longestyla; two Roses from Countess Grey were referred to Mr. Ramsbottom.

August 1, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

six other members present.

Roses from Countess Grey .- Mr. Exell of the British Museum reported that the two Roses shown at the last meeting both belonged to the variable R. multiflora var. cathayensis as defined by Rehder. Countess Grey had promised to send

British grasses.—Mr. Fraser showed Koeleria gracilis from the Hogsback, and the sub-species britannica, and from Dorman's Land the form with smooth

spikelets called glabriflora.

He also showed Festuca fallax, which is closely allied to F. rubra but is tufted in habit, from Littleworth Common, Surrey, and the Hogsback, and an albino

variety from the latter locality.

Gladiolus quartinianus.—A Gladiolus sent by Mrs. Malcolm McLaren from Buluwayo was identified at Kew as G. quartinianus, which is regarded as a species variable in the colour of its flowers and of wide distribution.

Gentiana saxosa was also sent from the Floral Committee B and identified with the description of the New Zealand plant. This plant came from Wisley.

Pollination of Pears.—Mr. C. H. Hooper gave an account of his attempts to cross pollinate Pears at Olantigh Gardens, Wye, and pointed out that bagged clusters set more fruits than those exposed, probably because less exposed to the vagaries of the weather.

August 15, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Wheatear Erica vagans.—Mr. Hanbury showed the curious "wheatear" form

of Erica vagans from his garden where it produces an occasional flower.

Antirrhinum aberrant.—An Antirrhinum was shown with much the same type of aberration where the bracts had been multiplied on the main axis and flowers were very infrequent. All cuttings from a particular plant had apparently shown this malformation.

Antirrhinum rust .- One or two further outbreaks of this rust on Antirrhinums due to Puccinia Antirrhini had been reported. This fungus, which had caused much loss among the plants in California, has appeared in several localities in southern England this season.

Woody plants on stone banks of Thames .- Mr. Fraser reported that many woody plants had become established on the stone-lined banks of the Thames, and furnished the following list: Platanus acerifolia, Vitis vinifera, Rubus Idaeus, R. laciniatus, Solanum Dulcamara, Ulmus montana, Philadelphus coronarius,

Ailanthus glanulosa, Ficus Carica, Saliz Caprea, S. atrocinerea, Alnus rotundifolia (glutinosa), Populus nigra betulifolia, P. marylandica × P. nigra betulifolia, Sambucus nigra, S. racemosa aurea, Frazinus excelsior, Acer Pseudoplatanus, Ligustrum vulgare, L. ovalifolium, Ribes nigrum, R. Grossularia, Crataegus monogyna, Clematis Vitalba, Pyrus Malus.

Acidanthera bicolor.—Mr. Clarence Elliott showed this beautiful bulbous

plant from Abyssinia, and it was referred to the Committee for naming.

August 29, 1933, Mr. F. J. HANBURY, F.L.S., V.M.H., in the Chair, and eight other members present.

British mints.—Mr. J. Fraser showed forms of British Mints allied to Mentha longifolia, viz. $M. \times miliacea$ villosa from Virginia Water, M. m. Halleri from

Cothill, M. m. villosa heterochroma, and M. m. sapida from Glamis.

Hybrid Rubi.—Mr. Crane showed specimens of the smooth form Rubus rusticanus inermis and of R. thyrsiger, which, crossed, gave mostly sterile hybrids with 21 chromosomes, and one very fertile hybrid with 28 chromosomes. A seedling from the last had produced no prickles.

Variation in Calluna vulgaris.—Mr. Hanbury brought a number of forms of Calluna vulgaris, mostly such as were growing wild in his garden. This plant is

extremely variable in habit, flower colour, hairiness of foliage, stature and so on.

Antirrhinum doubling.—Two examples from different sources of the common Antirrhinum with double flowers, were shown. Some degree of multiplication of petals was evident, petaloidy of the stamens and in some instances of the

FRUIT AND VEGETABLE COMMITTEE.

March 7, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and sixteen other members present. Exhibits.

Cheshunt Experimental Station: New Lettuces for glasshouses, 'Cheshunt Early Giant,' Cheshunt Early Cone,' 'Cheshunt Early Ball,' and older varieties for comparison.

Mr. E. A. Bunyard, Maidstone: Apple 'Orleans Reinette.'

South African Government: South African Fruit—Peaches, Nectarines, Plums, Grapes, etc.

March 21, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fifteen other members present. Exhibits.

Mr. E. A. Bunyard, Maidstone: Apple 'Belle de Boskoop.' Mr. W. F. Giles, Reading: Apple for opinion.

April 4, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fifteen other members present. Exhibits.

Messrs. Laxton, Bedford: Apple 'Laxton's Superb,' grown by Miss Murray, Cape Province, S. Africa.

Mr. W. Miles, Magdalen College Gardens, Oxford: seedling Apple. Mr. E. A. Bunyard, Maidstone: Apples 'Cox's Orange Pippin,' 'Brownlee's Russet.'

Commercial Fruit Trials, Wisley: Apples' Laxton's Superb,' King George V,' 'Heusgen's Golden Reinette,' 'Morley's Seedling,' 'Prince Alfred.

April 25, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and thirteen other members present. Exhibits.

Office of High Commissioner, South Africa House: Grapes for identification. Messrs. Jefferies, Cirencester: Apple sport from 'Galloway Pippin.' Mr. T. Avery, Gaddesden Place, Hemel Hempstead: Strawberry' Gaddesden,'

forced plants in pots.

Mr. H. Barnett, Tilehurst: Blossoms of Apple 'D'Arcy Spice 'for comparison with flowers from Wisley.

May 9, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present. Exhibit.

Cleypits Mushroom Farm, Thaxted: Mushrooms.

May 23, 1933, CHELSEA SHOW. Mr. E. A. BUNYARD, F.L.S., in the Chair, and nineteen other members present.

There was no business before the Committee on this occasion.

June 7, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and seven other members present.

Awards Recommended:

Bronze Hogg Medal.

To Mr. F. Warren, Tilston Nurseries, Goring-by-Sea, Worthing, for exhibit of Fig 'Brown Turkey.'
Other Exhibits.

Messrs. Fogwills, Guildford: Golden Podded Broad Beans.

Mr. E. A. Bunyard, Maidstone: Cherries 'Bigarreau Moreau,' 'Bigarreau Olivette,' 'Bigarreau Reverchon,' 'Belle d'Orleans,' 'Black Tartarian,' 'Guigne d'Annonau' 'Kascine Brube' and 'Noir d'Roulle.' d'Annonay,' 'Kassins Fruhe' and 'Noir d'Ecully.'

June 20, 1933, Mr. J. CHEAL, V.M.H., in the Chair, and nine other members present.

Awards Recommended :--

Silver-gilt Hogg Medal.

To Messrs. Rivers, Sawbridgeworth, for Peaches, Nectarines, Cherries, and Figs in pots.

Bronze Hogg Medal.

To Mr. T. Avery, Gaddesden Place, Hemel Hempstead, for group of fruiting Strawberries ('Gaddesden') in pots. Other Exhibit.

Messrs. Stuart Low, Enfield: Fig 'Large Black Duros.'

July 4, 1933, Mr W. H. DIVERS, V.M.H., in the Chair, and seven other members present. Exhibit.

Mr. T. H. Pratten, Shinfield, Reading: Raspberry Seedling.

July 18, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eight other members present.

Award Recommended :-

Silver Hogg Medal.

To Messrs. Allgrove, Slough: collection of Currants and Gooseberries.

Other Exhibits.

Col. Petre, Westwick, Norfolk: Seedling Black Currant 'Westwick No. 7.' Mr. E. C. Dyson, 6, High St., Ely: Yellow Windsor Broad Beans. Messrs. Dobbie, Edinburgh: Broad Beans 'Dobbie's Champion Long Pod,'

'Dobbie's Selected Broad Windsor.'

August 1, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members present. Exhibits.

Col. Petre, Westwick, Norfolk: Black Currant 'Westwick No. 7' (and fruit

of this variety from Commercial Fruit Trials, Wisley). Mrs. Dodd, Burnham-on-Sea: Seedling Apple.

C. Bowering, Esq., Chipstead: Seedling Melon.

August 15, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present. Exhibits.

Mr. E. A. Bunyard, Maidstone: Apple 'Red Astrachan,' and a branch of an apple tree illustrating the effect of pruning in early June. Mr. F. Jordan, Edenbridge: Peaches for identification. Mr. H. Barnett, Tilehurst: Figs for identification.

August 29, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and seven other members present. Exhibits.

Mr. E. Webb, Preston Rd., Brighton: Peach 'Webb's Brighton Beauty.'

Mr. W. Ingall, Grimoldby, Louth: Apple seedling 'William Ingall.' Miss E. H. Sleep, Egham: Plum seedling 'Magna Charta.' Col. E. G. Speir, North Berwick: Apple for opinion. Messrs. G. Bunyard, Maidstone: Plums and Nuts.

John Innes Horticultural Institution, Merton: Blackberries, spineless forms raised from Rubus rusticanus inermis × Rubus thyrsiger.

FLORAL COMMITTEE A.

March 7, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended:

Silver-gilt Banksian Medal. To Messrs. Wakeley, London, for Hyacinths, Crocuses and other bulbs.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Bath, Wisbech, for flowering bulbs in fibre.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants. To Mr. L. Mills, Welling, for Hyacinths, Tulips and Daffodils grown in pots for market.

Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Euphorbias and

To Mr. P. Ladds, Swanley Junction, for Cinerarias. To Swanley Horticultural College, Swanley, for Hippeastrums and Echeverias. Other Exhibits.

Mr. W. A. Bright, High Wycombe: Violets.

Mr. G. H. Dalrymple, Bartley: Freesia 'Lady Carew Pole.'

March 21, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Gold Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

To Messrs. Sutton, Reading, for Hyacinths.

Silver-gilt Banksian Medal. To Messrs. Allwood, Haywards Heath, for Carnations.

Silver Banksian Medal.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Banksian Medal.

To Bronwylfa Fruit Farm, St. Asaph, for blue Primroses.

To Messrs. Engelmann, Saffron Walden, for Carnations, Euphorbias and Pansies.

Selected for trial at Wisley.

Primrose 'E. R. Janes,' from Messrs. Prichard, Christchurch.

Primula seedling 8/30, from John Innes Horticultural Institution, Merton. (*Primula floribunda isabellina* \times *P. kewensis* (fertile form).) This is an F_3 individual. It is probably tetraploid. The F_1 and F_2 progenitors were both tetraploids.

To be seen again.

Carnation 'Pink Spectrum,' from Farnham Royal Nurseries, Farnham Royal. Carnation 'Scarlet Pimpernel,' from Messrs. Low, Enfield.

Other Exhibits. Mr. H. G. Longford, Abingdon: Polyanthus and Primroses. Mrs. John Stoney, Haughton: Primula 'Mrs. John Stoney.' Messrs. Wakeley, London: Tulips, Chionodoxas and Pansies, etc.

April 4, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. G. H. Dalrymple, Bartley, for Freesias. To Messrs. Engelmann, Saffron Walden, for Carnations, Euphorbias and Pansies.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants. Banksian Medal.

To Messrs. Adams, Tunbridge Wells, for Aubrietias, Pansies, etc.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.

To Mr. J. Douglas, Great Bookham, for Auriculas. To Mr. H. G. Longford, Abingdon, for Polyanthus.

Other Exhibit.

Viscountess Encombe, Winchester: Tropaeolum majus 'Longwood.'

April 25, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.

To Messrs. Chaplin, Waltham Cross, for Roses.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Blackmore & Langdon, Bath, for Schizanthus.

To Messrs. B. R. Cant, Colchester, for Roses.

To Mr. G. H. Dalrymple, Bartley, for Auriculas and Primulas. To Messrs. Dobbie, Edinburgh, for Schizanthus. To Mr. J. Douglas, Great Bookham, for Auriculas.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Toogood, Southampton, for Stocks. Banksian Medal.

To Miss Christy, Boyton Cross, for Polyanthus, etc. To Mr. H. Clarke, Taunton, for Violas, etc.

To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.

To Messrs. Ladhams, Southampton, for hardy plants.

To Messrs. Carter Page, London, for Dahlias.

To Swanley Horticultural College, for Schizanthus.
To Mr. C. Wall, Bath, for Aquilegias.
To Messrs. Watkins & Simpson, London, for Calceolarias and Ranunculus.

Preliminary Commendation.

To Iris 'Purissima,' from Lady Hudson (gr. Mr. H. G. Fulford), Roehampton. Iris Classification (Class I).

Other Exhibits. Mr. C. T. W. Bedbrook, Wallington: Auricula 'Eileen.'

Misses Cadell, Longniddry: Double Primroses and Auriculas.

Messrs. Crook, Beaconsfield: Polyanthus. Mrs. A. Fremantle, Penn: Polyanthus.

Mr. C. Gregory, Nottingham: Primulas and Violas. Misses Hopkins, Coulsdon: hardy plants.

Knap Hill Nursery, Woking: Anemone pavonina 'High Hall' strain. Mr. S. Ogg, Swanley: Dahlias.

Messrs. Oliver & Hunter, Moniaive: Polyanthus 'Abbey House.'

Messrs. Redgrove & Patrick, Sevenoaks: Double Nasturtiums.

Messrs. Slocock, Woking: Rose 'Blaze.' Mr. R. Staward, Ware: Primula 'Mrs. Wightman.'

Messrs. Stark, Fakenham: Polyanthus.

Mr. W. Stevens, Hoddesdon: Rose 'Climbing Lady Sylvia' (to be seen again).

May 9, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Carter, Raynes Park, for Cinerarias.

To Messrs. Dobbie, Edinburgh, for Sweet Peas.

To Messrs. Peed, West Norwood, for Streptocarpus.

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.

To Mr. E. Ladhams, Elstead, for hardy plants.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants. Banksian Medal.

To Messrs. Baker, Wolverhampton, for Trollius. To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Kelway, Langport, for Paeonies.

To Messrs. B. Ladhams, Southampton, for hardy plants.
To Mr. S. Ogg, Swanley, for Dahlias.
To Orpington Nursery Company, Orpington, for Irises.
To Messrs. Watkins & Simpson, London, for Ranunculus.
To Mr. G. E. P. Wood, Ashtead, for Anemones and Violas.

Selected for trial at Wisley.

Calceolaria multiflora nana strain, from Messrs. Carter, Raynes Park.

Cineraria 'Rainbow' strain from Messrs. Carter, Raynes Park.

The following plants received awards after trial at Wisley.

Highly Commended.

To Polyanthus 'Bath White,' from Messrs. Blackmore & Langdon, Bath. See p. 152.

Commended.

To Polyanthus 'Bath Yellow,' from Messrs. Blackmore & Langdon, Bath. See p. 152.

Other Exhibits.

Messrs. Clark, Dover: herbaceous plants. C. F. Coleman, Esq., Cranbrook: Saxifraga ' Jean.'

Messrs. Crook, Beaconsfield: Polyanthus.

Mr. G. R. Downer, Chichester: Lupins, Aubrietias, etc. Mrs. A. Fremantle, Penn: Polyanthus. Mr. J. O. E. Gibson, Ilkeston: White Daisy. Messrs. Gibson, Leeming Bar: Auriculas.

Mr. A. Hansen, New Barnet: Auricula 'The Gnome.'

Misses Hopkins, Coulsdon: hardy plants.
Mr. E. Ladhams, Elstead: Scilla campanulata 'Ruby, Excelsior Strain.'
B. A. Lewis, Esq., Putney Hill: hardy plants.
T. Lindsay, Esq., Caterham: Queen Polyanthus.
J. W. Morton, Esq., March: Pansy 'Bronze Knight.'
Major C. E. Radclyffe, Wareham: Lily of the Valley 'The Radclyffe.'

May 23, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

First-class Certificate.

To Carnation 'Robert Allwood' for cutting and market (votes unanimous), from Messrs. Allwood, Haywards Heath. See p. 147. Award of Merit.

To Begonia 'Allan Clarke' as a greenhouse pot plant (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 145.

To Begonia 'Marjorie Porton' as a greenhouse pot plant (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 145.

To Begonia 'Winifred Arnoll Davis' as a greenhouse pot plant (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 145.

To Distribute Alleradii: Davis' and Alleradii: To Distribute Alleradii: Davis of the Alleradii: To Distribute Alleradiii: To Distribute Alleradii: To Distribute Alleradii: To Distribute

To Dianthus Allwoodii 'Ruth' for bedding and cutting (votes 14 for, 5 against), from Messrs. Allwood, Haywards Heath. See p. 148.

To Erigeron 'Flame' as a hardy plant for the herbaceous border (votes 14 for, 7 against), from Mr. E. Ladhams, Elstead. See p. 149.

To Geum 'Gladys Perry' as a hardy rock-garden plant (votes unanimous), from Mr. A. Perry, Enfield. See p. 149.

To Rose 'Lord Lonsdale' (votes unanimous), from Messrs. Alex. Dickson,

Newtownards. See p. 153.

Selected for trial at Wisley.

Iceland Poppy 'Thorpe Hybrids,' from Mrs. D. Boyes, Cambridge.

Other Exhibits.

Messrs. Baker, Codsall: Lupins.

Mr. E. Ballard, Colwall: Bellis 'White Dresden China.'

Mr. A. Dawkins, Chelsea: Salvia 'Red Ensign' (to be seen again).

Messrs. Dickson & Robinson, Manchester: Petunia 'Carnation flowered.'

Messrs. Hillier, Winchester: Rose 'Climbing Little Dorrit' (to be seen again).

Messrs. Kelway, Langport: Pyrethrums and Border Pink 'Princess Elizabeth.

Messrs. Low, Enfield: Anthurium Scherzerianum and Rose 'Karen Poulsen' (to be seen again).

Messrs. Lowe, Crawley Down: Border Carnation 'Oakfield Clove.'

Mr. C. Wall, Bath: Border Carnations 'Mrs. C. Wall 'and 'The Dawn.'

June 7, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Silver-gilt Banksian Medal.

To Messrs. Barr, London, for Irises, Paeonies, etc.

To Major G. Churcher, Lindfield, for Paeonies.

To Mr. A. Perry, Enfield, for Irises, Alliums, and Ferns. Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and Pinks. To Messrs. Baker, Codsall, for Lupins.
To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
To Messrs. Gibson, Leeming Bar, for Lupins, Poppies, etc.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants. To Rev. H. Rollo Meyer, Watton, for Irises.
To Orpington Nurseries, Orpington, for Irises.
To Messrs. Peed, West Norwood, for Gloxinias.

To G. L. Pilkington, Esq., Woolton, for Irises.
To Messrs. Prichard, Christchurch, for Lupins.
To Messrs. W. H. Simpson, Birmingham, for Lupins.
To Messrs. Wallace, Tunbridge Wells, for Irises and Lilies.

Lindley Medal.

To G. P. Baker, Esq., Sevenoaks, for an exhibit of Irises entitled 'Surprises of the Iris Breeder.

Banksian Medal.

To Messrs. Bunyard, Maidstone, for Irises, Paeonies, etc.

To Messrs. Bunyard, Maidstone, for Roses. To Mr. G. R. Downer, Chichester, for Lupins.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Gavin Jones, Letchworth, for herbaceous plants. To Mr. G. G. Whitelegg, Chislehurst, for Irises.

Award of Merit. To Calceolaria hybrida 'Advance' as a hardy plant for the herbaceous border

and rock garden (votes 10 for), from Messrs. Dobbie, Edinburgh. See p. 146.

To Delphinium 'A. J. Moir' for show purposes (votes unanimous), from Messrs. Blackmore & Langdon, Bath. See p. 148.

To Delphinium 'The Sultan' for show purposes (votes unanimous), from

Messrs. Blackmore & Langdon, Bath. See p. 148.

The following plants received awards after trial at Wisley:

Award of Merit

To Perennial Lupin 'Blackpool Tower,' sent by The Garden Supplies, Liverpool. See p. 150.

To Perennial Lupin 'Hercules,' sent by Messrs. W. H. Simpson, Birmingham.

See p. 150.
To Perennial Lupin 'Lilac Domino,' sent by Messrs. W. H. Simpson. See p. 150. To Perennial Lupin 'Rowena,' sent by Messrs. W. H. Simpson. See p. 150.

Highly Commended.

To Perennial Lupin 'Hades,' sent by Messrs. W. H. Simpson. See p. 150. Other Exhibits.

Mr. F. A. Bishop, Clewer Green: Delphinium 'Nancy Wells.'

Messrs. Bloom, Oakington: Heucheras.
Mr. F. Bones, Cheshunt: Delphiniums 'Afterglow' and 'Mrs. J. J. V. Taylor.'

Messrs. Clark, Dover: herbaceous plants.

Mr. W. Dean, Kirkby Overblow: Polyanthus 'Camp Fire.'

Messrs. Hayward, Clacton: Dianthus.

Messrs. Hewitt, Solihull: Lupins.
Messrs. Kelway, Langport: Paeonies.
Mr. E. Ladhams, Elstead: Lychnis Flos-cuculi plena grandiflora.

J. M'Gregor, Esq., Glasgow: Dianthus 'Irish Pink.' Messrs. Pearson, Lowdham: Aquilegias. Messrs. Redgrove & Patrick, Sevenoaks: herbaceous plants.

Swanley Horticultural College, Swanley: Godetias.

June 20, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums To Messrs. Blackmore & Langdon, Bath, for Gloxinias.

XVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Silver-gilt Banksian Medal.

To Messrs. Barr, London, for Irises. To Mr. T. Bones, Cheshunt, for Delphiniums. To Messrs. Dickson, Newtownards, for Roses.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for Delphiniums, etc.

Silver Banksian Medal.

To Messrs. Baker, Codsall, for Delphiniums. To Messrs. Bath, Wisbech, for Paeonies.

To Messrs. Chaplin, Waltham Cross, for Roses.
To Dowty's Rosery, Wokingham, for Roses.
To Messrs. Kelway, Langport, for Delphiniums and Paeonies.
To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

Banksian Medal.

To Mr. Archer & Daughter, Sellindge, for Roses.

To Messrs. Bloom, Oakington, for Heucheras.

To Messrs. Bunyard, Maidstone, for Delphiniums and Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Hayward, Clacton-on-Sea, for Dianthus.

To Messrs. Hewitt, Solihull, for Delphiniums.

To Messrs. Gavin Jones, Letchworth, for herbaceous plants.

To Messrs. Ladhams, Southampton, for herbaceous plants. To Mr. A. Miles, Bickley, for herbaceous plants.

To Messrs. Warner, Boxted, for Roses.

Award of Merit.

To Chrysauthenum maximum 'Sunrise,' for cutting (votes unanimous), from Mr. Read, Brundall, nr. Norwich. See p. 147.

To Rose 'Empress' (votes unanimous), from Messrs. Chaplin, Waltham Cross.

See p. 153.
To Rose 'Gartendirektor Nose' (votes unanimous), from Messrs. Chaplin. See p. 153.

Selected for trial at Wisley.

Dianthus 'Good News,' from Lady Leconfield, Petworth.

Dianthus 'Sutton's Freedom,' from Messrs. Sutton, Reading.

Sweet Pea 'Marjorie,' from Mrs. F. Willey, St. Mellons.

The awards recommended to Dianthus on trial at Wisley were confirmed.

Other Exhibits.

Mr. Archer & Daughter, Sellindge: Rose 'Fairy Cluster.'
Mrs. Boyes, Cambridge: Poppy 'Thorpe Hybrids.'
Messrs. Cheal, Crawley: Dianthus 'Ecclesden Pink.'
Messrs. Clark, Dover: herbaceous plants.

Dean Gardens, Longniddry: hardy plants.

Misses Hopkins, Coulsdon: hardy plants.

Messrs. Kelway, Langport: Paeonies 'Evening World' and 'Great Sport.'

Mr. A. Perry, Enfield: Hemerocallis 'Mikado.'

Messrs. Prichard, Christchurch: Pink 'Winnie Lambert.'

Messrs. Redgrove & Patrick, Sevenoaks: herbaceous plants.

Messrs. Wheatcroft, Nottingham: Roses.

Mr. G. E. P. Wood, Ashtead: herbaceous plants.

June 27, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :-

Banksian Medal.

To Mr. A. Humphrey, Bramshott, Hants, for Begonias.

To Mr. James Fairlie, Acton, for Carnations.

Selected for trial at Wisley.

Delphinium ' Lady Belinda,' from the Rt. Hon. the Earl of Radnor, Salisbury. Dianthus plumarius 'New Elstead Strain,' from Mr. E. Ladhams, Elstead. Hemerocallis 'Amber,' from G. Yeld, Esq., Gerrards Cross.

Other Exhibit.

Miss R. Wheatcroft, Ewhurst: Roses.

July 4, 1933, Mr. J. M. BRIDGEFORD in the Chair, and fifteen other members present. Awards Recommended :--Silver-gilt Banksian Medal. To Messrs. Dobbie, Edinburgh, for Roses. To Messrs. Russell, Richmond, for Crotons. Silver Banksian Medal. To Messrs. Baker, Codsall, for Delphiniums. To Messrs. Bath, Wisbech, for Paeonies. To Messrs. Chaplin, Waltham Cross, for Roses. To D. B. Crane, Esq., Highgate, for Violettas. To Messrs. Gavin Jones, Letchworth, for herbaceous plants. To Mr. E. Ladhams, Elstead, for herbaceous plants and Nymphaeas. To Messrs. Lowe, Crawley Down, for Border Carnations. To Messrs. Stewart, Ferndown, for herbaceous plants. To Messrs. Sutton, Reading, for group of Dianthus 'Sutton's Freedom.' To Messrs. Warner, Boxted, for Roses. Banksian Medal. To Messrs. Barr, London, for herbaceous plants. To Mr. F. J. Bell, Whitley Bay, for Violas. To Messrs. Bloom, Oakington, for Heucheras, etc. To Mr. E. Clegg, Dewsbury, for Violas. To Messrs. Engelmann, Saffron Walden, for Carnations. To Messrs. Hayward, Clacton-on-Sea, for Dianthus. To Mr. A. Miles, Bickley, for herbaceous plants. To Mr. G. E. P. Wood, Ashtead, for Violas and other hardy plants. Award of Merit. To Dianthus 'Sutton's Freedom' for cutting or border (votes unanimous), from Messrs. Sutton, Reading. See p. 148. Selected for trial at Wisley. Violetta 'Aubrey' from D. B. Crane, Esq., Highgate. Other Exhibits. Messrs. Allwood, Haywards Heath: Border Carnations 'Golden Ray' and 'Sunkist. Mrs. Grey Bell, Lightwater: Border Carnations. Messrs. Clark, Dover: herbaceous plants. Messrs. Engelmann, Saffron Walden: Pansies. Mr. T. W. Pannell, Dunmow: Chrysanthemum maximum 'Pannell's Glory.' Messrs. Parsons, Gravesend: Pelargonium 'Thomas Earle.' Windward Violet Farm, Dawlish: Dianthus 'Alva Hall' (to be seen again). July 11, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present. Awards Recommended :-Silver-gilt Banksian Medal. To Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants. Silver Banksian Medal. To Messrs. Daniels, Norwich, for Larkspurs. To Messrs. Prichard, Christchurch, for herbaceous plants.

To Messrs. Sutton, Reading, for Antirrhinum 'Little Gem Mixed.' Banksian Medal.

To Mr. A. Miles, Bickley, for herbaceous plants.

Other Exhibits.

Misses Hopkins, Coulsdon: herbaceous plants.

Mrs. F. E. Withington, Bicester: Perpetual Border Carnations.

July 18, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Daniels, Norwich, for Larkspurs.

To Messrs. Dobbie, Edinburgh, for Larkspurs.

To Messrs. Peed, West Norwood, for greenhouse plants. Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for herbaceous plants.

To Messrs. F. Cant, Colchester, for Roses.

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To Mr. J. Douglas, Great Bookham, for Border Carnations.
    To Messrs. Kelway, Langport, for Gladioli.
    To Mr. E. Ladhams, Elstead, for herbaceous plants.
    To Messrs. Prichard, Christchurch, for herbaceous plants.
    To Messrs. Prior, Colchester, for Roses.
   To Suffolk Seed Stores, Woodbridge, for herbaceous plants.
  Banksian Medal.
    To Messrs. Bentall, Havering, for Roses.
    To Messrs. B. R. Cant, Colchester, for Roses.
To Messrs. Engelmann, Saffron Walden, for Carnations.
   To Mr. H. Hemsley, Crawley, for herbaceous plants.
To Messrs. Ladhams, Southampton, for herbaceous plants.
    To Mr. A. Miles, Bickley, for herbaceous plants.
   To Messrs. Reuthe, Keston, for herbaceous plants.
To Messrs. Stark, Fakenham, for Poppies.
To Mr. W. Yandell, Maidenhead, for Violas.
  Award of Merit.
    To Border Carnation 'David Douglas' for border, cutting, and exhibition
(votes unanimous), from Mr. J. Douglas, Great Bookham. See p. 147.

To Border Carnation 'Ettrick Dale' for border, cutting, and exhibition (votes unanimous), from Mr. J. Douglas. See p. 147.

Selected for trial at Wisley.
    Astilbe 'Fanal,' from Mr. G. Arends, Ronsdorf, Germany.
    Poppy 'The Fairy,' from Messrs. Stark, Fakenham.
Other Exhibits.
    Messrs. Clark, Dover: herbaceous plants.
    A. Crow, Esq., Epsom: Sweet Peas.
    Messrs. Forbes, Hawick: Phloxes and Pentstemons.
    J. L. Holbrook, Esq., Chingford: Gladioli 'Fair Maid' and 'Lady Fayre.'
    Misses Hopkins, Coulsdon: herbaceous plants.

Messrs. Kelway, Langport: Bocconia cordata 'Coral Plume' and Gladioli.

Messrs. Letts, Hadleigh: Roses 'Ivy Alice' and Climbing 'Little Dorritt'
(to be seen again).
    Mrs. C. Milburn, King's Somborne: Carnation 'Nancy Moss.'
Mr. R. C. Notcutt, Woodbridge: Campanula carpatica 'White Star.'

Messrs. Prichard, Christchurch: Campanula carpatica 'Chopin'
'Loveliness.'
                                                 Campanula carpatica 'Chopin'
    Messrs. Toogood, Southampton: Antirrhinum seedling.
    Messrs. Wheatcroft, Gedling: Roses.
    Windward Violet Farm, Dawlish: Dianthus 'Alva Hall.'
    Mr. G. E. P. Wood, Ashtead: Violas, Delphiniums etc.
   August 1, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other
members present.
Awards Recommended :-
   Silver-gilt Banksian Medal.
    To Messrs. Dickson, Newtownards, for Roses.
    To Messrs. Unwin, Histon, for Gladioli.
   Silver Banksian Medal.
    To Messrs. Allwood, Haywards Heath, for Carnations.
    To Messrs. Daniels, Norwich, for Gladioli and Hollyhocks.
    To Messrs. Kelway, Langport, for Gladioli.
    To Mr. E. Ladhams, Elstead, for herbaceous plants.
    To Messrs. Prichard, Christchurch, for herbaceous plants.
To Messrs. Wakeley, London, for Gladioli.
   Banksian Medal.
    To Messrs. Bentall, Havering, for Roses.
    To Messrs. B. R. Cant, Colchester, for Roses.
    To Mr. T. Carlile, Twyford, for Delphiniums.
    To Messrs. Engelmann, Saffron Walden, for Carnations.
    To Mr. A. Miles, Bickley, for herbaceous plants.
   Award of Merit.
    To Chrysanthemum 'Harvest Moon' for cutting and market (votes 11 for),
from Messrs. F. Woolman, Leicester. See p. 147.

To Gladiolus 'The O'Mahony' for exhibition (votes unanimous), from R. D. Trotter, Esq., Ockley. See p. 149.

To Rose 'Karen Poulsen' (votes unanimous), from Messrs. Wood & Ingram,
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Huntingdon. See p. 153.

The following award was made after trial at Wisley:

Award of Merit.

To Gladiolus ' Magna Blanca,' from Mr. Carl Salbach, California. See p. 149. The awards recommended to Calendulas and Perennial Phlox on trial at Wisley were confirmed.

Selected for trial at Wisley.

Border Carnation 'Swinley Ruby,' from the Dowager Marchioness of Linlithgow, Ascot.

Delphinium Belladonna 'Elstead Blue,' from Mr. E. Ladhams, Elstead. Dianthus 'Messines Pink,' from Messrs. Allwood, Haywards Heath.

Heucheras from Messrs. Bloom, Oaklington.

Other Exhibits.

Messrs. Allwood, Haywards Heath: Carnation 'Charming' (to be seen again).

Mrs. Malcolm Borwick, Northampton: seedling Border Carnation.

Messrs. Clark, Dover: herbaceous plants.

Mr. W. Geddes, Rumbling Bridge: Sidalcea 'Minnie Geddes.'

Mr. L. S. Harbutt, Wickhambrook: Scabious.

Messrs. Hayward, Clacton: herbaceous plants.

Mr. H. Hemsley, Crawley: Dahlias and herbaceous plants.

A Humphrey Rea Hawkhyret: unpamed Border Cornetion

A. Humphrey, Esq., Hawkhurst: unnamed Border Carnation. Messrs. Parsons, Gravesend: Pelargonium 'Thomas Earle.'

Messrs. Reuthe, Keston: herbaceous plants.

August 15, 1933, Mr. J. M. BRIDGEFORD in the Chair, and seventeen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Dobbie, Edinburgh, for Gladioli.

Silver Banksian Medal.

To Messrs. Bath, Wisbech, for Gladioli.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Mr. A. Miles, Bickley, for herbaceous plants. To Messrs. Carter Page, London, for Dahlias.

To Messrs. Prichard, Christchurch, for Montbretias and Lobelias. Banksian Medal.

To Messrs. Bentall, Havering, for Roses.

To Messrs. Bloom, Oakington, for herbaceous plants.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Kelway, Langport, for Gladioli.

To Knaphill Nursery Co., Knaphill, for Montbretias and Lilies. To Messrs. Ladhams, Southampton, for herbaceous plants.

To Messrs. Reuthe, Keston, for herbaceous plants. To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To Achimenes 'Minnie Rich' as a greenhouse pot plant (votes 15 for, 1 against), from L. F. C. Rich, Esq. (gr. Mr. G. H. Tolman), Northwood. See p. 145.
To Delphinium Belladonna 'Elstead Blue' for cutting (votes unanimous),

To Delpinnum Denadonna Elstead Blue' for cutting (votes unanimous), from Mr. E. Ladhams, Elstead Nurseries, Godalming. See p. 148.

To Heliopsis scabra 'Incomparabilis' as a hardy border plant (notes unanimous), from Messrs. Bloom, Oakington. See p. 149.

To Montbretia 'Herbert Perry' for cutting (votes unanimous), from the Hon. Mrs. E. S. Montagu (gr. Mr. J. E. Fitt), Attleborough. See p. 151.

To Montbretia 'J. Alan Fitt' for cutting (votes unanimous), from the Hon. Mrs. E. S. Montagu. See p. 151.

Mrs. E. S. Montagu. See p. 151.

To Montbretia 'Rosemary' for cutting (votes unanimous), from the Hon. Mrs. E. S. Montagu. See p. 151.

Selected for trial at Wisley.

Dianthus Allwoodii 'Phœbe', from Messrs. Allwood, Haywards Heath.

Other Exhibits.

Mr. T. Carlile, Twyford: herbaceous plants. Messrs. Clark, Dover: herbaceous plants.

Messrs. Gurden, Oxford: Delphiniums.
Mrs. H. W. Hall, Lymington: Aster 'Salmon Gold.'
Mr. L. S. Harbutt, Wickhambrook: Scabious.

Messrs. Letts, Hadleigh: Roses, Dahlias, and herbaceous plants.

Messrs. Reeves, Norwich: Roses.

XXII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

August 29, 1933, Mr. J. M. BRIDGEFORD in the Chair, and seventeen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Barr, London, for Montbretias and Lilies.

To Messrs. Bath, Wisbech, for Gladioli.

To Mr. E. Ladhams, Elstead, for herbaceous plants. To Napsbury Mental Hospital, St. Albans, for Browallias.

To Mr. S. Ogg, Swanley, for Dahlias.

To Messrs. Carter Page, London, for Dahlias.

To Messrs. Prichard, Christchurch, for herbaceous plants. To Mr. J. B. Riding, Chingford, for Dahlias. To Messrs. Wakeley, London, for Gladioli.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden for Carnations.

To Messrs. Kelway, Langport, for Gladioli.

To Mr. A. Miles, Bickley, for herbaceous plants.

The following awards were made after trial at Wisley:

Award of Merit.

To Begonia (Tuberous-rooted) 'Fascination' Strain, from Messrs. Blackmore & Langdon, Bath. See p. 145.

To Begonia (Tuberous-rooted) 'Frilled Single 'Strain, from Messrs. Blackmore

& Langdon. See p. 146.

To Begonia (Tuberous-rooted) 'Single' Strain, from Messrs. Blackmore & Langdon. See p. 146.

To Physostegia virginica 'Vivid,' from Mr. A. Perry, Enfield. See p. 151.

Other Exhibits.

Mr. T. Carlile, Twyford: herbaceous plants. Major G. Churcher, Lindfield: Gladioli.

Messrs. Clark, Dover: herbaceous plants.

Messrs. J. & T. Johnson, Tibshelf: Chrysanthemum 'Milady.'

Mr. C. F. Kipping, Mayland: Chrysanthemum 'Brilliant.' Messrs. Pearson, Lowdham: Marigolds.

Mr. G. E. P. Wood, Ashtead: Delphiniums.

FLORAL COMMITTEE, Section B.

March 7, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-six other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Clarence Elliott, Stevenage, for alpine and bulbous plants in pans. To Messrs. J. Waterer, Sons & Crisp, Bagshot and Twyford, for flowering and alpine plants.

Silver Banksian Medal.

To Messrs. Casburn, Bedford & Page, Cambridge, for alpine plants.

To Messrs. Russell, Richmond, for flowering shrubs.

Banksian Medal.

To Messrs. Barr, Taplow, for Hellebores and bulbous plants.

To Brookside Nurseries, Oxford, for Saxifrages and other alpine plants.

To Messrs. Cheal, Crawley, for flowering shrubs and alpine plants. To Dartington Hall Gardens, Totnes, for alpine plants and shrubs.

To Mr. T. M. Endean, Laindon, for succulent plants.

To Messrs. Hemsley, Crawley, for evergreen shrubs and alpine plants.
To Messrs. Hillier, Winchester, for flowering shrubs.
To Hocker Edge Gardens, Cranbrook, for bulbous and Cape plants.
To Messrs. Prichard, Christchurch, for Saxifrages and other alpine plants.

To Messrs. Reuthe, Keston, for shrubs and alpine plants.

To Messrs. Stewart, Ferndown, for shrubs and bulbous plants.

To Walton Park Nurseries, Walton, for flowering shrubs. To Mr. G. E. Welch, Cambridge, for alpine and bulbous plants. Award of Merit.

To Camellia japonica 'Apple Blossom' as a hardy flowering shrub (votes 18 for), from E. M. Preston, Esq., Hayes, Kent. See p. 146.

To Viola eizanensis as a flowering plant for the cool house (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 154. Other Exhibits.
G. P. Baker, Esq., Sevenoaks: Crocus Sieberi versicolor.

Messrs. Baker, Codsall: alpine plants and shrubs. Major L. H. Brammall, Bickley: alpine plants.

Chez Nous Nurseries, Newick: alpine plants.
Dame Alice Godman, D.B.E., Horsham: Lachenalia ovatifolia.
Mrs. Vera Higgins, Croydon: Crassula hemisphaerica.
Misses Hopkins, Coulsdon: alpine plants.

Mr. A. Kench, Weybridge: alpine plants.
Mr. E. Ladhams, Elstead: shrubs and alpine plants.
Sir Wm. Lawrence, Br., Burford: Lowicera × Purpusii. Marsden Nurseries, Ashstead: alpine plants and shrubs.

Lady Martineau, Ascot: Kalanchoë Fedtschenkoi.

Messrs. Maxwell & Beale, Broadstone: alpine plants and shrubs.

Messrs. Neale, Newhaven: succulents.

Mr. G. P. Porter, West Moors: alpine plants. Messrs. Rogers, Southampton: shrubs and alpine plants. Mr. S. Sims, Draycott: alpine and bulbous plants.

Messrs. Sutton, Reading: Kalanchoë globulifera coccinea.

Mrs. Tracey, Wimborne: Corydalis rutaefolia.

Messrs. Treseder, Truro: Telopea speciosissima.

T. West, Esq., Merstham: Saxifraga lilacina.

The Director, R.H.S. Gardens, Wisley: Gentiana acaulis var., Scilla bifolia rosea.

March 21, 1933, Mr. E. A. Bowles, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. C. Elliott, Stevenage, for alpine plants.

To Admiral A. W. Heneage-Vivian, Swansea, for Rhododendrons. Silver Banksian Medal.

To Brookside Nurseries, Oxford, for alpine plants.

To Messrs. Cheal, Crawley, for shrubs and alpine plants. To Messrs. Prichard, Christchurch, for alpine plants.

To Messrs. Russell, Richmond, for Clematis, Azaleas and stove plants. Banksian Medal.

To Messrs. Barr, Taplow, for Irises, Hellebores and bulbous plants.

To G. P. Baker, Esq., Sevenoaks, for alpine plants in pans.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for Viburnum Burkwoodii and other shrubs.

To Messrs. Casburn, Bedford & Page, Cambridge, for alpine plants. To Dartington Hall Gardens, Totnes, for alpine plants.

To Messrs. Hemsley, Crawley, for shrubs and alpine plants. To Hocker Edge Gardens, Cranbrook, for an alpine garden. To Mr. E. Ladhams, Elstead, for shrubs and hardy plants. To Mr. G. Reuthe, Keston, for shrubs and alpine plants.

To Messrs. Waterer, Bagshot, for Rhododendrons and other shrubs. To Messrs. Waterer, Twyford, for alpine plants. To Mr. G. E. Welch, Cambridge, for alpine plants in pans.

To West Moors Nurseries, Dorset, for alpine plants.

Award of Merit.

To Fritillaria obliqua as a hardy flowering plant (votes unanimous), from the Knap Hill Nursery Co., Woking. See p. 149.

To Primula × Berninae, Windrush var., as a flowering plant for the rock garden and alpine house (votes 12 for), from P. Rosenheim, Esq., E. Molesey. See p. 152.

To Serapias neglecta as a terrestrial Orchid for the alpine house (votes 10 for),

from the Hon. H. D. McLaren, Bodnant. See p. 153.

Cultural Commendation.

To Mr. F. Barker, Stevenage, for a pan of Saxifraga Friderici-Augustii. To Mr. F. Tustin, gardener to Mark Fenwick, Esq., Stow-on-the-Wold, for pans of Trillium rivale and Shortia uniflora grandiflora. Other Exhibits.

Hiatt C. Baker, Esq., Almondsbury: Anemone coronaria. Messrs. Baker, Codsall: alpine plants and shrubs. Major L. H. Brammall, Bickley: alpine plants.

XXIV PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Chez Nous Nurseries, Newick: alpine plants.

Messrs. Clark, Dover: shrubs and Primulas.

Dr. P. L. Giuseppi, Felixstowe: Anemonella thalictroides. Dame Alice Godman, D.B.E., Horsham: Cyanella capensis. The Misses Hopkins, Coulsdon: alpine plants.
Mr. A. Kench, Weybridge: alpine plants.

Sir Wm. Lawrence, Bt., Burford: Hippeastrum Reginae, Sempervivum Schlehanii var. bruneifolium.

G. W. E. Loder, Esq., Ardingly: Lindera obtusiloba. Marsden Nursery, Ashtead: shrubs and rock plants.

Messrs. Maxwell & Beale, Broadstone: shrubs and alpine plants.

Mrs. H. Milford, Chedworth: alpine plants.

Owermoigne Nurseries, Dorchester: alpine plants.

Reading University, Reading: Lachenalia convallariodora.

Mr. J. Robinson, Eltham: alpine plants and shrubs. Messrs. Rogers, Southampton: shrubs and alpine plants.

Mr. S. Sims, Draycott: Scillas and Muscari.

Messrs. Stewart, Ferndown: shrubs and bulbous plants.

Mrs. Torkington, Maidenhead: Primula Juliae 'Snowflake.'

April 4, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver Banksian Medal.

To Mr. G. Reuthe, Keston, for Rhododendrons and alpine plants.

Lindley Medal.

To Messrs. Russell, Richmond, for varieties of Clematis Armandii. Banksian Medal.

To Messrs. Barr, Taplow, for Irises, Primulas and Fritillarias.

To Dartington Hall Gardens, Totnes, for shrubs and alpine plants.

To Messrs. C. Elliott, Stevenage, for alpine plants. To Mr. T. M. Endean, Laindon, for succulents.

To Messrs. Hillier, Winchester, for flowering shrubs. To Mr. E. Ladhams, Elstead, for hardy plants and shrubs.

To Messrs. Neale, Newhaven, for succulents.

To Messrs. Prichard, Christchurch, for bulbous and alpine plants.

To Messrs. Waterer, Bagshot, for Rhododendrons and alpine plants. To Mr. G. E. Welch, Cambridge, for alpine plants.

Award of Merit.

To Acacia longifolia mucronata as a flowering shrub for the greenhouse (votes 13 for), from Messrs. Stuart Low, Bush Hill Park. See p. 145.

To Azara Gilliesii as a hardy flowering shrub (votes unanimous), from the

Donard Nursery Co., Newcastle, co. Down. See p. 145.

To Campanula tubulosa as a flowering plant for the alpine house and rock garden (votes unanimous), from Dr. P. L. Giuseppi, Felixstowe. See p. 147.

To Primula Edgworthii as a flowering plant for the alpine house and rock garden (votes 14 for), from T. Hay, Esq., Hyde Park, London. See p. 152.

To Primula pubescens alba as a flowering plant for the alpine house and rock garden (votes 11 for), from Messrs. C. Elliott, Stevenage. See p. 152.

To Saxifraga diapensioides as a flowering plant for the alpine house and rock

garden (votes 7 for, 3 against), from Messrs. C. Elliott, Stevenage. See p. 153. Cultural Commendation.

To Mr. B. Leach, gardener to Sir Oscar Warburg, Headley, for a pan of Rhodothamnus chamaecistus.

Other Exhibits.

Messrs. Baker, Codsall: alpine plants and shrubs.

E. A. Bunyard, Esq., Maidstone: Aucuba japonica forma salicifolia.

Col. Stephenson R. Clarke, C.B., Haywards Heath: Camellia reticulata flore pleno, Prunus Mume alba fl. pl.

Dorset Nurseries, Blandford: alpine plants and shrubs. Mr. T. M. Endean, Laindon: Pelargonium echinatum.

Misses Hopkins, Coulsdon: alpine plants.

Mr. A. Kench, Weybridge: shrubs and alpine plants.

Kr. A. Kench, Weybridge: shrubs and alpine plants.

Kr. B. Ladhams, Southampton: shrubs and alpine plants.

Sir Wm. Lawrence, Bt., Burford: Townsfeldia exscapa, Phlox ovata, Campanula Andrewsii.

Major T. C. Lawrence, Farnham Common: Hippeastrum equestre.

Marsden Nursery, Ashtead: shrubs and rock plants.

Messrs. Maxwell & Beale, Broadstone: shrubs and alpine plants. Mrs. H. Milford, Chedworth: Ranunculus insignis. Messrs. Redgrove & Patrick, Sevenoaks: shrubs and alpine plants.

Mr. J. Robinson, Eltham: alpine plants.

Messrs. Rogers, Southampton: shrubs and alpine plants.

Capt. B. Symons-Jeune, Old Windsor: Cerasus serrulata 'Jeune's Weeping.' C. R. Scrase-Dickins, Esq., Horsham: Camellias.

Messrs. Stewart, Ferndown: shrubs and alpine plants. Miss G. Waterer, Long Rock: Lysichiton americanum. West Moors Nursery, Wimborne: alpine plants.

April 25, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. C. Elliott, Stevenage, for alpine plants.

To Hocker Edge Gardens, Cranbrook, for alpine plants and dwarf shrubs.

To Messrs. Neale, Newhaven, for Gazanias and succulents.

To Messrs. Prichard, Christchurch, for alpine plants.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for shrubs.

To Messrs. Casburn, Bedford & Page, Cambridge, for alpine plants.

To Mr. Gavin Jones, Letchworth, for alpine plants. To Knap Hill Nursery Co., for Rhododendrons and other shrubs.

To Mr. E. Ladhams, Elstead, for shrubs and hardy plants.

To Dr. MacWatt, Duns, for Primulas.

To Messrs. Maxwell & Beale, Broadstone, for alpine plants and shrubs.

To Mr. R. C. Notcutt, Woodbridge, for shrubs.

To Mr. G. Reuthe, Keston, for shrubs and alpine plants.

To Messrs. Rogers, Southampton, for shrubs and alpine plants.

To Messrs. Russell, Richmond, for Azaleas.

To Messrs. Waterer, Twyford, for alpine plants and shrubs. To Mr. G. E. Welch, Cambridge, for alpine plants.

Award of Merit.

To Gentiana angustifolia, Leith Vale var., as a hardy flowering plant (votes 7 for, 3 against), from R. D. Trotter, Esq., Ockley. See p. 149.

To Pyrus magdeburgensis as a hardy flowering shrub (votes unanimous),

from Mr. R. C. Notcutt, Woodbridge. See p. 152.

To Sandersonia aurantiaca as a flowering plant for the cool house (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 153.

Cultural Commendation.

To Messrs. Casburn, Bedford & Page, Cambridge, for a stone trough of Gentiana verna.

Other Exhibits.

G. P. Baker, Esq., Sevenoaks: Brunfelsia calycina, Fritillaria graeca, Prunus prostrata.

Messrs. Barr, Taplow: Primulas and other hardy plants.

Miss Beck, Ware: Fritillaria pallidiflora.

Messrs. Burkwood & Skipwith, Kingston-on-Thames: Cytisus 'Geoffrey Skipwith.

Mrs. Carbonell, Bideford: Aquilegia viridiflora.

Chez Nous Nurseries, Newick: shrubs and alpine plants. Dartington Hall Gardens, Totnes: shrubs and alpine plants.

Dorset Nurseries, Blandford: shrubs and alpine plants. Mr. A. Hansen, New Barnet: alpine plants. Messrs. Hemsley, Crawley: shrubs and alpine plants.

Lord Horder, Petersfield: Gentiana acaulis.

Mr. A. Kench, Weybridge: alpine plants.

James Macgregor, Esq., Glasgow: Artemisia vulgaris variegata.
Lt.-Col. L. C. R. Messel, O.B.E., Handcross: Azara lanceolata.
Sir Wm. Milner, Bt., Skipton: Saxifraga cuprea, Primula florida.
Messis. Redgrove & Patrick, Sevenoaks: shrubs and alpine plants.

Mr. J. Robinson, Eltham: alpine plants.

Messrs. Stewart, Ferndown: shrubs and alpine plants.

Mr. G. G. Whitelegg, Chislehurst: Iris Hoogiana.

XXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

May 9, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Mr. R. C. Notcutt, Woodbridge, for Lilacs and Brooms.

To Messrs. Waterer, Bagshot, for Rhododendrons.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for Brooms and other shrubs.

To Messrs. C. Elliott, Stevenage, for alpine plants.

To Knap Hill Nursery Co., for Rhododendrons.

To Messrs. Neale, Newhaven, for succulents.

- To Messrs. Pennell, Lincoln, for Clematis and Statice.
- To Messrs. Prichard, Christchurch, for alpine plants. To Mr. J. Robinson, Eltham, for alpine plants.

To Messrs. Rogers, Southampton, for hardy plants.

Award of Merit.

To Ceanothus 'Delight' as a hardy flowering shrub (votes 14 for), from Messrs. Burkwood & Skipwith, Kingston-on-Thames. See p. 147.

To Pimelia orthocephala as a flowering shrub for the cool house (votes 12 for),

from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 152.

To Pyrus hansuensis as a hardy flowering tree (votes 9 for, 2 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 152.

To Rosa Ecae as a hardy flowering shrub (votes II for), from the Knap Hill

Nursery Co., Woking. See p. 153.

To Rosmarinus officinalis angustissimus 'Benenden Blue' as a hardy flowering

shrub (votes 12 for), from Collingwood Ingram, Esq., Benenden. See p. 153.

To Syringa 'Kathleen Havemeyer' as a hardy flowering shrub (votes unanimous), from Mr. R. C. Notcutt, Woodbridge. See p. 154.

Preliminary Commendation.

To Viola pedata alba as a flowering plant for the alpine house and rock garden (votes 6 for, 2 against), from Mr. A. Kench, Weybridge. Other Exhibits.

Messrs. G. I. Adams, Tunbridge Wells: hardy plants.

R. G. Berkeley, Esq., Worcester: Discaria discolor.
Messrs. Casburn, Bedford & Page, Cambridge: alpine plants.

Messrs. Clark, Dover: shrubs.

Dorset Nurseries, Blandford: shrubs and rock plants.

Mrs. W. R. Dykes, Woking: Moraea spathacea.
Messrs. C. Elliott, Stevenage: Pentstemon Barrattae.
Mr. A. Hansen, New Barnet: rock plants.

Collingwood Ingram, Esq., Benenden: Exochorda Wilsonii.
John Innes Hort. Inst., Merton: Iris Barnumae var. urmiensis.
Mr. A. Kench, Weybridge: Aquilegia longissima.
F. Moorman, Esq., Birmingham: Primula chionantha.
Messrs. Redgrove & Patrick, Sevenoaks: hardy plants.

Messrs. Stewart, Ferndown: shrubs.

Messrs. Waterer, Twyford: alpine plants and shrubs. Miss E. Willmott, Great Warley: Cotoneaster rhamnoides.

May 23, 1933 (at Chelsea), Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-five other members present.

Awards Recommended :-

Award of Merit.

To Beschorneria yuccoides as a flowering plant for the greenhouse (votes 12 for, I against), from Messrs. Hillier, Winchester. See p. 146.

To Meconopsis betonicifolia pratensis as a hardy flowering plant (votes 20 for), from the Hon. Henry McLaren, Bodnant. See p. 151.

To Paeonia 'Charles England' as a hardy flowering plant (votes 14 for), from Hiatt C. Baker, Esq., Almondsbury. See p. 151.

To Picea Albertiana conica as a hardy dwarf Conifer (votes unanimous), from Messrs. Hillier, Winchester. See p. 151.

To Primula lichiangensis, Highdown var., as a hardy flowering plant (votes 12 for, 6 against), from F. C. Stern, Esq., Goring-by-Sea. See p. 152.

To Silene Ingramii as a flowering plant for the alpine house or rock garden (votes 16 for, 1 against), from Miss Enid M. Vale, Wolverhampton. See p. 154.

To Thalictrum kusianum as a flowering plant for the alpine house and rock garden (votes unanimous), from Sir Wm. Lawrence, Bt., Burford. See p. 154.

Preliminary Commendation.

To Crataegus 'Cheal's Crimson 'as a hardy flowering tree (votes unanimous), from Messrs. J. Cheal, Crawley.

Cultural Commendation.

To Dame Alice Godman, D.B.E., South Lodge, Horsham, for a pan of Omphalodes Luciliae. Other Exhibits.

Mrs. Gwendolyn Anley, Woking: Dianthus 'Gwendolyn Anley.'

Hiatt C. Baker, Esq., Almondsbury: Ceanothus velutinus.
J. Barthelemy, Esq., Wimborne: Cupressus macrocarpa compacta lutea.
Messrs. Burkwood & Skipwith, Kingston-on-Thames: Cytisus 'Peter Pan.' W. J. Caparne, Esq., Saints' Bay, Guernsey: Aster fruticosus, Arctotis laevis, A. acaulis, A. stoechadifolius.

Mr. G. S. Crouch, Wrotham: hybrid Mimulus. Mrs. des Voeux, Newbury: hybrid Meconopsis.

Mrs. Lloyd Edwards, Wrexham: Aubrietia Trevor Rose, Erinus alpinus. Messrs. C. Elliott, Stevenage: Aquilegia longissima, Dudleya pulverulenta, Iris cristata alba.

Messrs. Hewitt, Solihull: Thalictrum dipterocarpum 'Hewitt's Double.' Messrs. Hillier, Winchester: Pyrus floribunda Hillieri, Thuya orientalis minima glauca, Cupressus obtusa ericoides, Berberis Hookeri.
Collingwood Ingram, Esq., Benenden: Erythrolaena conspicua.
Sir Wm. Lawrence, Bt., Burford: Sempervivum Schlehanii, Polypodium

Scouleri, Aquilegia corymbosa.

Lady Leconfield, Petworth: Syringa reflexa.
G. W. E. Loder, Esq., Ardingly: Drimys Winteri latifolia, Syringa Wilsonii. The Hon. Henry McLaren, Bodnant: Primula 'Bodnant Orange,' P. 'Bodnant Salmon.

Lt.-Col. L. C. R. Messel, O.B.E., Handcross: Photinia villosa, Discaria discolor, Baccharis umbelliformis.

Mr. R. C. Notcutt, Woodbridge: Syringa 'Prodige,' Calycotome infesta.
Mr. Amos Perry, Enfield: Liriope graminifolia.
Lady Rayleigh, Terling: Rheum sp., Foeniculum vulgare piperitum.
The Director, R.H.S. Gardens, Wisley: Meconopsis × Musgravei.
F. C. Stern, Esq., Goring-by-Sea: Corokia macrocarpa, Paeonia Moutan 'Cheronia,' P. Moutan 'Dresden China,' Eremurus himalaicus.
Mrs. Talbot. Heilevylux: Acuilegia sugusolens

Mrs. Talbot, Haileybury: Aquilegia suaveolens.

June 7, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :-Silver Lindley Medal.

To Messrs. Sutton, Reading, for an exhibit of South African annuals. Banksian Medal.

To Messrs. Elliott, Stevenage, for alpine plants.

To Mr. Gavin Jones, Letchworth, for alpine plants.

To Sir Wm. Lawrence, Bt., Burford, for species and varieties of Iridaceae. To Maytham Gardens, Rolvenden, for grey-foliaged hardy plants. To Messrs. Russell, Richmond, for Nymphaeas and rock plants.

First-class Certificate.

To Aesculus indica as a hardy flowering tree (votes II for, I against), from the Director, Royal Botanic Gardens, Kew. See p. 145.

Award of Merit. To Campanula Poscharskyana as a flowering plant for the rock garden (votes unanimous), from Dr. P. L. Giuseppi, Felixstowe. See p. 147.

To Campanula saxatilis as a flowering plant for the alpine house (votes 11 for, 1 against), from Dr. P. L. Giuseppi. See p. 147.

To Campanula spathulata var. Giuseppii as a flowering plant for the rock garden (votes 10 for, 5 against), from Dr. P. L. Giuseppi. See p. 147.

To Eremurus 'Dawn' as a hardy flowering plant (votes 12 for), from F. C.

Stern, Esq., Goring-by-Sea. See p. 148.

To Jasminum Parkeri as a hardy flowering shrub (votes unanimous), from G. P. Baker, Esq., Sevenoaks. See p. 149.

To Leucothoe Davisiae as a hardy flowering shrub (votes unanimous), from

the Director, R.H.S. Gardens, Wisley. See p. 149.
To Lilium × Philras var. 'Skinner's Orange' as a hardy flowering plant (votes 16 for, 1 against), from Lt.-Col. G. S. F. Napier, Horeham Road, E. Sussex

See p. 150.
To Sophora viciifolia as a hardy flowering shrub (votes unanimous), from

F. C. Stern, Esq., Goring-by-Sea. See p. 154.

Other Exhibits.

F. Barker, Esq., Stevenage: Verbena tridens.

J. McGregor, Esq., Maryhill: Hypericum grandiflorum.

F. J. Hanbury, Esq., E. Grinstead: Cynoglossum nervosum, Mertensia maritima.

T. Hay, Esq., Hyde Park: Blumenbachia chuquitensis, Cytisus Battandieri. Mr. W. J. Jennings, St. Albans: Vinca rosea.

John Innes Hort. Inst., Merton: Amsonia illustris, Hibiscus 'Sunset.'
The Director, R.B.G., Kew: Rhododendron × Osbornei.

Sir Wm. Lawrence, Bt., Burford: Lilium x chalpyr, Anomatheca cruenta alba.

Marsden Nursery, Ashtead: alpine plants.

Messrs. Maxwell & Beale, Broadstone: alpine plants.

Major L. H. Brammall, Bickley: alpine plants.

Misses Hopkins, Coulsdon: hardy plants.

Messrs. Burkwood & Skipwith, Kingston-on-Thames: shrubs.

Lt.-Col. G. S. F. Napier, Horeham Road: Lilium × philumbel, L. × philras.

Mr. Amos Perry, Enfield: Gladiolus alatus var. 'Brilliant.' Messrs. Rogers, Southampton: alpine plants.
The Director, R.H.S. Gardens, Wisley: Senecio saxifragoides, Primula florida.
F. C. Stern, Esq., Goring-by-Sea: Allium Murrayanum, Leycesteria crocothvrsos.

Messrs. Sutton, Reading: Delphinium Brunonianum, Pentstemon pulchellus,

Silene colorata, Gorteria diffusa.

June 20, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. R. Wallace, Tunbridge Wells, for Lilies and Irises.

Silver Banksian Medal.

To Mr. W. A. Constable, Paddock Wood, for Lilies.

To Mr. T. M. Endean, Laindon, for Mammilarias and other succulents. Banksian Medal.

To Messrs. Cheal, Crawley, for flowering shrubs.

To Messrs. Hillier, Winchester, for shrubs and hardy plants.

To Hocker Edge Gardens, Cranbrook, for alpine plants and Liliums. To Mr. Amos Perry, Enfield, for Liliums, Calochorti and Hemerocallis.

To Mr. J. Robinson, Eltham, for alpine plants. To Messrs. Russell, Richmond, for Nymphaeas and shrubs.

Award of Merit.

To Iris Taitii as a hardy flowering plant (votes 8 for, 4 against), from Colling-

wood Ingram, Esq., Benenden. See p. 149.

To Nierembergia hippomanica as a tender flowering plant (votes 15 for), from T. Hay, Esq., Hyde Park, London. See p. 151.

Preliminary Commendation.

To Gentiana × mersthamensis as a flowering plant for the rock garden and alpine house (votes 6 for, 3 against), from Mr. W. Wells, jun., Merstham. Other Exhibits.

Mrs. D. Bevington Smith, Witham: Sempervivum arachnoideum.

Mrs. E. A. Britton, Tiverton: Campanula rupestris, Cyananthus sp., Pentstemon Cobaea.

Messrs. Burkwood & Skipwith, Kingston-on-Thames: shrubs. Chez Nous Nurseries, Newick: alpine plants.

Mr. W. A. Constable, Paddock Wood: Lilium × michiganense.

Collingwood Ingram, Esq., Benenden: Iberis Welwitschii, Gladiolus hybrid. The Director, R.B.G., Kew: Robinia Hartwegii.

Messrs. Stuart Low, Enfield: Passiflora 'Imperatrice Eugènie.'

Messrs. Maxwell & Beale, Broadstone: alpine plants.

Lt.-Col. L. C. R. Messel, O.B.E., Handcross: Lilium cernuum, Deutzia sp., Prostranthera lasianthus, Ozothamnus rosmarinifolius var. ericifolius. Messrs. Redgrove & Patrick, Sevenoaks: alpine plants.

Messrs. Rogers, Southampton: shrubs and alpine plants.

L. de Rothschild, Esq., Exbury: Ozothamnus rosmarinifolius var. ericifolius. Mr. W. Wells, jun., Merstham: Gentiana Purdomii x lagodechiana.

June 27, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-Silver Lindley Medal.

To Major Dorrien Smith, Tresco Abbey, Isles of Scilly, for a large flowering specimen of Puya alpestris.

Award of Merit.

To Astilbe koreana as a hardy flowering plant (votes 11 for, 3 against), from T. Hay, Esq., Hyde Park, London. See p. 145.

To Campanula excisa as a flowering plant for the rock garden and alpine house (votes 14 for, 3 against), from Dr. P. L. Giuseppi, Felixstowe. See p. 146.

Preliminary Commendation.

To Lilium 'Red Gauntlet' as a hardy flowering plant (votes 12 for, 3 against),

from Messrs. Dobbie, Edinburgh.

To Ursinia 'Aurora' as a half-hardy annual flowering plant (votes 9 for), from Messrs. Sutton, Reading. Other Exhibits.

Messrs. Burkwood & Skipwith, Kingston-on-Thames: Ceanothus 'Dignity.' Dr. P. L. Giuseppi, Felixstowe: Jasione pyrenaica, Crepis incanus.

The Countess Grey, Howick: Rosa sp.

Lord Horder, Petersfield: Lilium Martagon album.

Capt. R. C. Jenkinson, Woking: Lilium cernuum, Gladiolus imperialis. Mr. E. Ladhams, Elstead: Iris Kaempferi 'Rose Queen.'

July 4, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. R. Wallace, Tunbridge Wells, for Liliums and Alstroemerias. Silver Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for Liliums and other hardy plants. Banksian Medal.

To Mr. T. M. Endean, Laindon, for succulents.

To Mr. Amos Perry, Enfield, for Liliums and other hardy plants.

To Mr. J. Robinson, Eltham, for alpine plants.

To Messrs. T. Yano, Portman Sq., W. 1, for dwarf shrubs. Award of Merit.

To Campanula 'Brookside' as a flowering plant for the greenhouse (votes unanimous), from Messrs. L. R. Russell, Richmond, Surrey. See p. 145.

To Campanula 'Brookside' as a flowering plant for the rock garden (votes

unanimous), from Brookside Nurseries, Oxford. See p. 146.

To Dimorphotheca pinnata as a half-hardy annual flowering plant (votes 8 for, 3 against), from Messrs. Sutton, Reading. See p. 148.

To Scabiosa speciosa as a hardy flowering plant (votes 9 for), from T. Hay,

Esq., Hyde Park, London. See p. 153.

Preliminary Commendation.

To Zaluzianskya selaginoides as a hardy annual flowering plant (votes 6 for, 5 against), from Messrs. Sutton, Reading.

Cultural Commendation.

To Mr. Amos Perry, Enfield, for a specimen plant of Dionaea muscipula. Other Exhibits.

C. W. Christie Miller, Esq., Swyncombe: Lonicera Hildebrandtiana.

Misses Hopkins, Coulsdon: rock plants.

Sir Wm. Lawrence, Bt., Burford: Jaberosa integrifolia. Messrs. Maxwell & Beale, Broadstone: rock plants.

July 11, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-

Gold Medal (with congratulations).

To Messrs. R. Wallace, Tunbridge Wells, for Lilies and other hardy plants and shrubs.

Gold Medal.

To Mr. W. A. Constable, Southborough, for Lilies and shrubs.

Silver-gilt Flora Medal.

To Messrs. R. H. Bath, Wisbech, for Lilies.

To Knap Hill Nursery Co., Woking, for Lilies and other hardy plants and shrubs. Silver Lindley Medal.

To Messrs. Dobbie, Edinburgh, for Lilies.

Silver Flora Medal.

To Hocker Edge Gardens, Cranbrook, for Lilies and other hardy plants and shrubs.

Silver Banksian Medal.

To Messrs. Barr, Taplow, for Lilies and other hardy plants. To Lt.-Col. L. C. R. Messel, O.B.E., Handcross, for a group of *Lilium Duchartrei* Farreri.

To Mr. Amos Perry, Enfield, for Lilies and Hemerocallis.

Banksian Medal.

To Messrs. Hillier, Winchester, for Lilies and shrubs.

To Messrs. L. R. Russell, Richmond, for Nymphaeas and other hardy plants.

Award of Merit. To Leucothoe Keiskii as a hardy evergreen flowering shrub (votes 12 for),

from Messrs. Hillier, Winchester. See p. 150.

To Lilium 'Golden King' as a hardy flowering plant (votes 15 for, 1 against), from J. E. H. Stooke, Esq., Hereford. See p. 150.

To Lilium × testaceum, Jones's variety, as a hardy flowering plant (votes unanimous), from Frank Jones, Esq., Lechlade. See p. 150.

To Lilium × 'Maxwill' as a hardy flowering plant (votes 13 for), from F. C.

Stern, Esq., Goring-by-Sea. See p. 150.

To Nierembergia frutescens as a hardy flowering plant (votes 13 for, 2 against),

from F. C. Stern, Esq., Goring-by-Sea. See p. 151.

To Phlomis cashmeriana as a hardy flowering plant (votes 16 for), from T. Hay, Esq., Hyde Park, London. See p. 151.

Preliminary Commendation.

To Lilium Henryi var. citrinum as a hardy flowering plant (votes unanimous),

from Messrs. R. Wallace, Tunbridge Wells.

To Lilium × 'Mystic' as a hardy flowering plant (votes unanimous), from Messrs. R. Wallace, Tunbridge Wells. Other Exhibits.

Mark Fenwick, Esq., Stow-on-the-Wold: Deinanthe coerulea.

Dame Alice Godman, D.B.E., Horsham: Hydrangea quercifolia.

Countess Grey, Howick: Rosa sp., Rhododendron myrlifolium.

Messrs. Hillier, Winchester: Gaultheria depressa, Tripetaleia paniculata.

Lord Horder, Petersfield: Plagianthus Lyallii.

Frank Jones, Esq., Lechlade: Lilium pardalinum × Humboldtii magnificum.

Sir Wm. Lawrence, Bt., Burford: Escallonia albiflora.

Major A. Pam, Broxbourne: Alstroemeria nemorosa.
T. J. Spooner, Esq., Russell Sq., London: Delphinium consolida.
J. E. H. Stooke, Esq., Hereford: Lilium × Willcrovidii.
Dr. Fred Stoker, Loughton: Lilies and Hydrangeas.

Messrs. R. Wallace, Tunbridge Wells: Lilium tsingtauense. Mrs. C. M. Whittall, Haslemere: Clematis Viorna coccinea.

July 18, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eighteen other

members present. Awards Recommended:-

Silver-gilt Banksian Medal.

To Messrs.Neale, Newhaven, for succulents.

Silver Banksian Medal.

To Messrs. L. R. Russell, Richmond, for stove plants.

Banksian Medal.

To Knap Hill Nursery Co., Woking, for Liliums.

To Mr. Amos Perry, Enfield, for Hemerocallis.

Award of Merit.

To Campanula hercegovina as a flowering plant for the rock garden and alpine house (votes 10 for), from Sir Wm. Lawrence, Bt., Burford. See p. 146.

Preliminary Commendation.

To Cyananthus microphyllus as a flowering plant for the rock garden and alpine house (votes unanimous), from T. Hay, Esq., Hyde Park, London.

To Gentiana cashmeriana as a flowering plant for the rock garden and alpine

house (votes unanimous), from T. Hay, Esq., Hyde Park, London. Other Exhibits.

Edwin Beckett, Esq., Radlett: Clematis bicolor.

Countess Grey, Howick: Rosa multiflora.

H. Harwood Smith, Esq., Hove: Escallonia × Iveyi. Mr. E. Ladhams, Elstead: Campanula sp.

Sir Wm. Lawrence, Bt., Burford: Crinum sp., Diosphaera dubia. Hugh Miller, Esq., Sevenoaks: Sempervivum Heuffelii glabrum.

Mr. Amos Perry, Enfield: Rubus roseus plenus.

August 1, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended:

Silver Banksian Medal.

To Messrs. Prichard, Christchurch, for alpine plants.

Flora Medal.

To Mr. W. A. Constable, Southborough, for Lilies.

To Messrs. Russell, Richmond, for Nymphaeas and other aquatics.

Banksian Medal.

To Mr. Amos Perry, Enfield, for hardy plants.

Award of Merit.

To Catalpa bignonioides as a hardy flowering tree (votes 15 for), from G. W. E. Loder, Esq., Ardingly. See p. 147.

To Catalpa ovata as a hardy flowering tree (votes 12 for), from G. W. E.

Loder, Esq. See p. 147.

To Cnicus conspicuus as a half-hardy biennial flowering plant (votes 13 for, 3 against), from Collingwood Ingram, Esq., Benenden. See p. 148.

To Erica cinerea var. 'Eden Valley' as a hardy flowering shrub (votes 15 for), from Miss G. Waterer, Long Rock, Cornwall. See p. 148.

Preliminary Commendation.

To Campanula Morettiana alba as a flowering plant for the rock garden and alpine house (votes 6 for), from Dr. Fred Stoker, Loughton. Other Exhibits.

G. P. Baker, Esq., Sevenoaks: Verbascum spinosum, Campanula Vidalii.

Countess Grey, Howick: Genista aethnensis, Hoheria lanceolata.

T. Hay, Esq., Hyde Park: Solidago lithospermifolia.

Misses Hopkins, Coulsdon: rock plants.

Collingwood Ingram, Esq., Benenden: Gladiolus purpureo-auratus.

The Director, R.B.G., Kew: Impatiens kewensis.

G. W. E. Loder, Esq., Ardingly: Catalpa Fargesii.
Mrs. Robert Lukin, Burghfield Common: Fumaria africana, Teucrium sp.
Mrs. Malcolm MacLaren, Burghfield Common: Gladiolus sp. L. de Rothschild, Esq., Exbury: Rhododendron Kyawii. The Director, R.H.S. Gardens, Wisley: Gentiana saxosa. R. D. Trotter, Esq., Ockley: Hydrangea hortensis.

August 15, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eleven other members present.

Awards Recommended :-Silver Banksian Medal.

To Messrs. Hillier, Winchester, for shrubs and hardy plants.

Banksian Medal.

To Mr. Amos Perry, Enfield, for hardy plants. To Messrs. Russell, Richmond, for Clematis.

Award of Merit.

To Eriogonum nudum var. rubrum as a hardy flowering plant (votes 8 for),

from Sir Wm. Lawrence, Bt., Burford. See p. 149.

To Statice 'Coeleste' as a flowering plant for the greenhouse (votes 6 for, r against), from Messrs. Russell, Richmond. See p. 154.

Other Exhibits. Messrs. C. Elliott, Ltd., Stevenage: Acidanthera bicolor.

Dame Alice Godman, Horsham: Cestrum Parquii.

Capt. H. G. Hawker, Ermington: Hedychium Hawkeri, H. Moorei.

Misses Hopkins, Coulsdon: rock plants. Sir Wm. Lawrence, Bt., Burford: Gentiana Lawrencei, Hibiscus grandiflorus, Pleiocarpa mutica.

Mrs. Leonard Lees, Brecon: Anthemis Sancti-Johannis.

Mr. Amos Perry, Enfield: Statice Mourettii. Messrs. Prichard, Christchurch: alpine plants.

August 29, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Banksian Medal.

To Miss Britton, Tiverton, for hardy plants.

Preliminary Commendation.

To Gentiana gilvostriata as a flowering plant for the alpine house and rock garden (votes 10 for), from the Hon. Henry McLaren, Bodnant. Other Exhibits.

Messrs. Brown & Such, Maidenhead: varieties of Solidago.

Misses Hopkins, Coulsdon: hardy plants.

Mr. W. J. Jennings, St. Albans: Quamoclit pinnata.

Messrs. Prichard, Christchurch: Papaver alpinum laciniatum.

Messrs. Russell, Richmond: Clematis and Coleus.

Messrs. T. Tyson & Son, Crawley: Lilium formosanum.

Sir Francis Younghusband, Westerham: Lilium Wallichianum.

JOINT DELPHINIUM COMMITTEE.

June 20, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and ten other members present.

Awards Recommended :-

Award of Merit.

To Delphinium 'Ayliffe' for exhibition (votes unanimous), from Mrs. Hugh Lang (gr. Mr. G. H. Denby), Woking. Long close spike; flowers double, well placed, outer petals sky-blue, inner petals pale lavender; eye white. Parentage, Millicent Blackmore.

To Delphinium 'Lady Clara' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. Very long, bold spike; flowers semi-double, pale

lavender-mauve, outer petals tinged pale blue; eye white, roundish.

To Delphinium 'Lady Teresa' for exhibition (votes 7 for, 2 against), from Messrs. Blackmore & Langdon, Bath. Bold spike; flowers semi-double, deep

rosy-purple; eye creamy-white with violet stripes.

To Delphinium 'Norah Hotblack' for exhibition (votes unanimous), from H. S. Hotblack, Esq., Cuckfield. Medium spike; flowers semi-double, large, well placed, pale lavender, outer petals tinged pale blue; eye white. Parentage, 'J. Pitts' and 'Phyllis.'

To Delphinium 'Whitethroat' for cutting (votes unanimous), from C. F.

Hill, Esq., Hillingdon. Spike medium, tapering; flowers double, bright blue

tinged rosy-lavender; eye white. Other Exhibits.

Messrs. Blackmore & Langdon, Bath: Delphinium 'Lady Janet.'

Messrs. Hewitt, Solihull: Delphinium Belladonna var. 'Merlin.' C. F. Hill, Esq., Hillingdon: Delphinium 'Mrs. C. F. Hill ' (to be seen again). Messrs. Kelway, Langport: Delphinium 'Purple Sceptre.'

Mrs. Hugh Lang, Woking: Delphinium 'Ononi.'

June 29, 1933, Mr. J. M. BRIDGEFORD in the Chair, and twelve other members present.

Awards Recommended :-

Award of Merit.

To Delphinium 'Blue Spire' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. Tall, close, tapering spike; flowers deep blue; small dark eye.

To Delphinium 'Codsall Girl' for exhibition (votes 10 for, 1 against), from Messrs. Baker, Codsall. Very long spike; flowers large, pale blue tinged lilac;

To Delphinium 'Daydream' for exhibition (votes 8 for, 3 against), from Messrs. Hewitt, Solihull. Flowers placed well apart on spike; azure-blue; prominent dark eye.

To Delphinium 'Duchess of Portland' for exhibition (votes 9 for, 2 against),

from Messrs. Blackmore & Langdon, Bath. Bold spike; flowers semi-double, ultramarine-blue; eye small, white.

To Delphinium 'Hilary Hanson' for exhibition (votes 8 for, 4 against), from

R. G. Hanson, Esq., Greasley, nr. Nottingham. Good compact spike; flowers double, outer petals blue, inner petals violet-mauve; eye dark.

To Delphinium 'Lady Belinda' for cutting and exhibition (votes unanimous), from the Rt. Hon. the Earl of Radnor (gr. Mr. S. W. Tucker), Longford Castle, Salisbury. Compact medium spike; flowers large, double, white. One of the

best white varieties yet raised.

To Delphinium 'Lady Rodney' for exhibition (votes 11 for), from Mr. T. Bones, Cheshunt. Bold spike; flowers large, double, outer petals sky-blue,

inner petals lilac-mauve; eye dark.

To Delphinium 'Primrose' for exhibition (votes unanimous), from Messrs. Blackmore & Langdon, Bath. Medium spike; flowers semi-double, deep cream, eye pale primrose. Other Exhibits.

Messrs. Baker, Codsall: Delphinium 'Country Girl.' Mr. T. Carlile, Twyford: Delphinium 'Wendy. Messrs. Hewitt, Solihull: Delphinium 'Dragonfly.'

R. F. A. Riesco, Esq., Haddington: Delphinium 'Mrs. Foster Cunliffe, Sport.'

 July 4, 1933, Mr. J. M. Bridgeford in the Chair, and five other members present.

Award Recommended :-

Award of Merit.

To Delphinium 'Dorothy Ackroyd' for exhibition (votes unanimous), from Mrs. D. Ackroyd (gr. Mr. V. Huffey), Bury St. Edmunds. Good tall spike; flowers double, deep blue slightly tinged lilac; eye dark.

 July 11, 1933 (at Leeds), Mr. G. W. Leak, V.M.H., in the Chair, and six other members present.

There were no exhibits before the Committee on this occasion.

July 18, 1933, Mr. C. F. Langdon in the Chair, and six other members present. No awards were recommended on this occasion. Exhibits.

Mrs. H. Mitchell, Bradford: Delphinium 'A. C. Mitchell.'

H. S. Wainwright, Esq., Leeds: Delphinium 'H. S. Wainwright.'

JOINT IRIS COMMITTEE.

May 9, 1933, Sir William Lawrence, Bt., V.M.H., in the Chair, and nine other members present. Exhibit.

Mrs. H. P. Thompson, Deepfield, High Pine Close, Weybridge, Surrey: Iris pallida triglavensis.

May 23, 1933, at Chelsea Show, Mr. F. C. STERN, F.L.S., in the Chair, and thirteen other members present.

Selected for trial at Wisley.
Irises 'Skyscraper,' 'Ciros,' 'Bobbingcourt,' all from the late Mrs. W. R. Dykes, Woking.

June 7, 1933, Mr. F. C. STERN, F.L.S., in the Chair, and seven other members present.

Awards Recommended :---

Award of Merit.

To Iris Pseudacorus alba (votes unanimous), from Sir William Lawrence, Bt., Burford. Foliage dark green; stem branched at and above the middle, 6-flowered; flowers cream, reticulated near the tip, pale purplish-brown on deep cream; falls circular, standards minute. Award recommended for general garden use.

Preliminary Commendation.

To Iris 'Blue Danube' (votes unanimous), from Rev. Rollo Meyer, Watton-

at-Stone, Hertford. Standards light blue; falls soft bluish-violet.

To Iris 'Madrigal' (votes unanimous), from The Orpington Nursery Co., Orpington, Kent. A white-ground plicata pencilled deep blue.

Selected for trial at Wisley.

Iris sibirica 'Margaret,' 'Dryade,' 'Mayfly;' Iris × sibulleyana and Iris seedling plicata, all from Messrs. R. W. Wallace, Tunbridge Wells.

Irises 'Pink Lotus,' Evangeline,' Banneret' and 'Madrigal,' from the Orpington Nursery Co., Orpington. Irises 'Meldoric' and 'Pendell,' from Mrs. Hamilton Rowan, Bletchingley.
Iris 'Dresden China,' from G. P. Baker, Esq., Sevenoaks, Kent.
Irises 'Radiance,' 'Blue Danube' and 'Tika,' from Rev. Rollo Meyer,

Watton-at-Stone Rectory, Hertford.

Iris seedling plicata, from Mr. F. Burton, Hildenborough, Kent.

JOINT RHODODENDRON COMMITTEE.

February 21, 1933, Admiral A. W. HENEAGE-VIVIAN in the Chair, and fifteen other members present.

Award Recommended :--

Award of Merit.

To Rhododendron 'Choremia' as a hardy flowering shrub (votes 13 for), from the Hon. Henry McLaren, Bodnant. An attractive hybrid raised by the exhibitor from the cross R. haematodes x R. arboreum. The dwarf, spreading plant has lanceolate leaves dark green above and finely white-tomentose beneath. waxy, crimson-scarlet flowers, which recall those of R. haematodes, are resistant to frost and last an unusually long time. Other Exhibits.

The Hon. Henry McLaren, Bodnant: R. aperantum, pink form.

L. de Rothschild, Esq., Exbury: R. retusum.

March 7, 1933, Mr. E. H. WILDING in the Chair, and fourteen other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron mallotum as a hardy flowering shrub (votes 9 for, 2 against), from Col. Stephenson R. Clarke, C.B., Borde Hill, Sussex. A showy shrub or small tree belonging to the subseries Haematodes of the series Neriiflorum. The large, obovate leaves are thick and rough, with a dense brown tomentum beneath. The tubular-campanulate crimson flowers are arranged in compact terminal umbels of twelve or more.

Cultural Commendation.

To Mr. W. Everatt, gardener to Sir Wm. Lawrence, Bt., Burford, for a large specimen plant of Rhododendron indicum 'Frau Heinrich Seidel.'

March 21, 1933, Mr. G. W. E. LODER, F.L.S., in the Chair, and nineteen other members present.

Awards Recommended :-

First-class Certificate.

To Rhododendron Hookeri as a hardy flowering shrub (votes unanimous), from the Hon. Henry McLaren, Bodnant, N. Wales. A handsome species of the Thomsonii subseries, occurring at altitudes of 8,000 to 9,000 feet in Bhutan. It is an erect shrub with smooth, oblong leaves glaucous beneath and large, flattish clusters of twelve to fifteen flowers. The large, five-lobed, crimson corolla is surrounded by an enlarged, irregularly divided calyx of similar colouring.

Award of Merit.

To Rhododendron cyanocarpum as a hardy flowering shrub (votes unanimous), from Lady Loder, Leonardslee, Sussex. A species from Western Yunnan, roin Lady Louer, Leonardsiee, Sussex. A species from Western Yuhnan, closely allied to the Himalayan R. Thomsonii. It is a shrub or small tree with rounded elliptic leaves which are dark green and smooth above, paler and glaucous beneath. The large, widely-campanulate flowers are white with an external flush of rosy pink, and are carried in somewhat lax umbels.

To Rhododendron 'Daphne' as a hardy flowering shrub (votes to for, I against), from E. J. P. Magor, Esq., St. Tudy, Cornwall. The parentage of this hybrid is given as R. arboreum 'Blood Red' and R. Thomsonii × R. nerii-

florum. The bright crimson flowers have large coloured calyces and are carried

in compact trusses. The leaves resemble those of R. Thomsonii.

To Rhododendron fulgens as a hardy flowering shrub (votes unanimous), from G. W. E. Loder, Esq., Ardingly. A species of the Campanulatum Series, from high altitudes in Sikkim and Nepal. It forms a rounded shrub 4 to 8 feet high. The broadly obovate leaves are dark green and glossy above and of paler colour beneath. The tubular-campanulate, blood-red flowers are closely set in rounded

To Rhododendron 'Penllyn' as a hardy flowering shrub (votes unanimous), from the Hon. Henry McLaren, Bodnant. A very beautiful hybrid raised from the cross R. orbiculare × R. Aucklandii. The large flowers are of delicate texture, and the colour is shell-pink, with darker lines on the inside of the corolla.

To Rhododendron repens var. chamae-Thomsonii as a hardy flowering shrub (votes 8 for, 2 against), from Lionel de Rothschild, Esq., Exbury. A handsome creeping undershrub 6 inches to a foot high. The elliptic leaves are dark green and somewhat bullate on the upper surface, paler and glandular beneath. The

deep scarlet, trumpet-shaped flowers are borne singly or in pairs.

To Rhododendron' Seta' as a hardy flowering shrub (votes unanimous), from the Hon. Henry McLaren, Bodnant. An interesting and pretty hybrid said to have been raised from the cross R. spinuliferum $\times R$. moupinense. It is an erect-growing plant with ovate, pointed leaves and rather full clusters of tubular-campanulate white flowers suffused with pale pink. Other Exhibits.

Mrs. Chas. Hext, Trebah, Cornwall: seedling.

E. L. P. Magor, Esq., Lamallan, St. Tudy: R. agastum, R. campylocarpum × R. irroratum, R. sutchuenense × R. barbatum, R. rotundifolium × R. arboreum, etc. Mr. W. C. Slocock, Woking: R. 'Mrs. Henry Chelson,' R. × 'Early Brilliant,' R. 'Goldsworth Pink.'

The Hon. Henry McLaren, Bodnant: R. 'Aruna,' R. 'Amba,' R. 'Hiraethlyn,' R. 'F. C. Puddle.'

Lt.-Col. L. C. R. Messel, Nymans, Handcross: R. glischroides (F. 26455,

F. 27463) and forma rubra from F. 26455.
Admiral A. W. Heneage-Vivian, Swansea: R. 'Clyne Pink,' R. 'Clyne Cerise,' R. 'Clyne Blush,' R. 'Clyne Pearl,' R. 'Brocole.'

April 4, 1933, Mr. G. W. E. Loder, F.L.S., in the Chair, and fourteen other members present.

Awards Recommended:— First-class Certificate.

To Rhododendron calophytum as a hardy flowering shrub (votes unanimous), from Dame Alice Godman, South Lodge, Horsham. A Chinese species (Fortunei series) with large oblanceolate leaves. The fragrant open campanulate flowers are pale pink deepening towards the base where is a dark red blotch, in loose, many-flowered trusses on bright red pedicels; a conspicuous discoid yellow stigma adds to the attractiveness of the flower, (A.M. March 9, 1920, JOURNAL R.H.S., 46, lvii).

To Rhododendron russatum as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. A dwarf 'Lapponicum' species from China, about 2 feet high, with scaly brown branches, small leaves scaly on both sides, and close few- (4-5) flowered inflorescences of intense purple open-campanulate flowers, each about an inch across; the throat is conspicuously white-pubescent. The plant shown had a lepidote calyx, thus agreeing with R. raum rather than R. russatum, in which the calyx is stated to be glabrous. R. russatum received the A.M. on May 3, 1927 (JOURNAL R.H.S., 53, liii).

Award of Merit.

To Rhododendron fulvum as a hardy flowering shrub or small tree (votes 8 for, 2 against), from the Hon. Henry McLaren, Bodnant. This Chinese (Yunnan) species is ornamental in both foliage and flowers, the leaves being dark green above and bright cinnamon beneath, owing to a dense suede-like hair-covering, while the campanulate flowers are pink with a crimson blotch at base, arranged in a many-flowered compact truss.

To Rhododendron' Leonardslee Loki' as a hardy shrub (votes unanimous), from Lady Loder, Leonardslee. A seedling from R. 'Cornubia' with large open-campanulate deep crimson flowers about 3 inches across and borne in dense trusses. It differs from R. 'Cornubia' in its smaller leaves and darker, more open flowers.

To Rhododendron' Leonardslee Primrose' as a hardy shrub (votes unanimous), from Lady Loder. A hybrid (R. arboreum album x campylocarpum) with primrose flowers dotted on the upper half with small maroon spots, in close many-flowered trusses; pedicels glandular; the oblong-elliptic leaves are up to 5 inches long.

To Rhododendron sperabiloides as a hardy dwarf flowering shrub (votes 12 for, I against), from Lionel de Rothschild, Esq. A low-growing Tibetan species of the Neriiflorum series allied to R. sperabile but probably a better and more showy plant for gardens. It has oblanceolate leaves, tomentose beneath and up to 3 inches long; the campanulate flowers are borne in loose 3- to 6-flowered umbels, and are lustrous deep crimson.

To Rhododendron Valentinianum as a dwarf shrub for alpine house and rock garden under favourable conditions (votes unanimous), from the Hon. Henry McLaren. A Chinese species introduced and named by Forrest, forming a low, compact bush, conspicuously ciliated on nearly all parts; leaves fringed with

long brown hairs and about an inch long, while the medium-sized yellow flowers are externally lepidote. This attractive little plant is hardy at the foot of a wall at Bodnant.

Other Exhibits.

Col. S. R. Clarke, Haywards Heath: R. probum (Rock 59059).

Lady Loder, Leonardslee: R. hylothreptum.

Mrs. Montefiore, Plymouth: R. eximium, R. sperabile (K.W. 7124), R. bachvtrichum.

Sir John F. Ramsden, Bt., Gerrard's Cross: R. campylocarpum × dicroanthum. Mr. R. Richardson, Hornchurch: white and rose Azaleas, well-flowered, for which the Committee passed a vote of thanks.

Mr. W. C. Slocock, Woking: R. caucasicum × Thomsonii.

Admiral A. Walker-Heneage-Vivian, Swansea: R. niveum × Falconeri.

April 25, 1933, Mr. G. W. E. LODER, F.L.S., in the Chair, and thirteen other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron 'Faggetter's Favourite' as a flowering shrub (votes unanimous), from Mr. W. C. Slocock, Woking. A hybrid derived from R. Fortunei, the other parent unknown, with large and broadly expanded flowers, pink-flushed at the margins and carried in large trusses about 7 inches across.

May 2, 1933, Mr. G. W. E. LODER, F.L.S., in the Chair, and twenty other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron eriandrum (white form) as a hardy flowering shrub (votes 8 for), from Mr. H. White, Sunningdale Nurseries. Rock 59,207. Series Triflorum. A white form of a lavender-flowered species, with small polished elliptic leaves scarcely 2 inches long, and almost rotate, scented, and slightly pink-flushed flowers about 1½ inch across in many-flowered heads about 3 inches

across. It requires slight shelter.

To Rhododendron 'Tittenhurst' as a hardy flowering shrub (votes II for, 4 against), from Mr. H. White. A hybrid between R. barbatum and R. Wightii with somewhat bullate leaves about 6 inches long, 21 inches broad, and primrose

campanulate flowers in many-flowered rounded trusses.

To Rhododendron habrotrichum as a flowering shrub (votes 14 for, 1 against), from Mr. H. White. A Yunnan species of the Barbatum series, with campanulate pink flowers on glandular red pedicels in close rounded trusses. Leaves oblongelliptic, cordate at base, about 6 inches long and 3 inches across, the margin conspicuously ciliated. This species requires overhead shelter.

To Rhododendron 'Bonfire' as a hardy flowering shrub (votes unanimous),

from Messrs. J. Waterer, Sons & Crisp, Bagshot. A hybrid raised in 1928 from R. discolor × 'Mrs. R. G. Shaw' crossed with R. Griersonianum. Flowers deep

red, in trusses about 6 inches across.

To Rhododendron pallescens as a hardy flowering shrub (votes 14 for), from Lionel de Rothschild, Esq., Exbury. A very attractive dwarf shrub of the Yunnanense subseries allied to R. Davidsonianum and described by Hutchinson as a new species in the Gard. Chron. 93, p. 418 (1933). It appeared as a stray seedling in Rock 59,574 from West China and may possibly be a natural hybrid between R. Davidsonianum and R. racemosum. It forms a sparse-foliaged bush 2 feet or more high with smooth branchlets and acute or acuminate, lanceolate or oblanceolate leaves about 3 inches long, smooth above, glaucous and lepidote below. The small flowers are white, pink-flushed along the margin and dotted with pink inside the tube, and are borne profusely.

To Rhododendron javanicum as a tender flowering shrub (votes 14 for, 5 against), from Lionel de Rothschild, Esq. A deep orange species, pink in the throat, with some stamens petaloid, stated to have been raised from Javan seed.

May 9, 1933, Lt.-Col. Stephenson R. Clarke in the Chair, and nine other members present.

Awards Recommended :-First-class Certificate.

To Rhododendron Edgeworthii as a half-hardy flowering shrub for the greenhouse (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross, Sussex. A Himalayan species well known in cultivation, with bullate leaves densely cinnamon-tomentose beneath; the broadly expanded large white scented flowers are borne in usually 3-flowered clusters.

Award of Merit.

To Rhododendron K.W. 6413 (later determined as R. polyandrum by Mr. Hutchinson) as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E. A species of the Maddenii series, introduced from Tibet in 1925, attaining 10 to 15 feet; leaves broadly lanceolate, dark green above, cinnamonlepidote below, up to 4 inches long and 11 inch broad; flowers trumpetshaped, about 3 inches long, fragrant and of firm texture, creamy-white deepening to yellow in the throat, carried in 6-flowered clusters on short lepidote pedicels.

To Rhododendron (Azalea) 'Mrs. Oliver Slocock' as a hardy flowering shrub

for general garden use and forcing (votes unanimous), from Mr. W. C. Slocock, Woking. A showy hybrid Azalea (altaclarensis x mollis x sinensis) with large apricot flowers, becoming ruddy at the margins, in many-flowered trusses about

5 inches across.

To Rhododendron 'Naomi' as a flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. A hybrid of R. 'Aurora' (Thomsonii × hewense) and R. Fortunei, with large pink flowers on glandular pedicels; leaves about 5 inches long, 2 inches broad.

May 23, 1933, Mr. E. H. WILDING in the Chair, and fifteen other members present.

Awards Recommended :-

First-class Certificate.

To Rhododendron Simsii as a flowering shrub (votes 13 for), from G. W. E. Loder, Esq., Wakehurst Place, Sussex. This Azalea has long been confused with R. indicum. The plant shown was raised from seed collected by Forrest in Western China, where the species is widespread; the five-lobed flowers are bright rose, widely expanded and nearly 3 inches across, with eight to ten stamens, and are borne singly or in pairs at the tips of the shoots; the leaves are broadly elliptic.

To Rhododendron 'Tally-Ho' as a hardy flowering shrub (votes unanimous), from Lady Loder, Leonardslee, and J. J. Crosfield, Esq., Embley Park, Romsey. The name R. Tally-Ho' covers all seedlings raised between R. Griersonianum and R. eriogynum. The two seedlings shown were almost identical in flower but differed in the size of the leaves, R. eriogynum being the female parent of one and R. Griersonianum of the other. The flowers are large and funnel-shaped, about 2 inches long, bright red and borne in many-flowered trusses 6-9 inches across, while the leaves have a loose brown tomentum beneath, being nearly 12 inches

long in Lady Loder's plant.

To Rhododendron 'Lady Bessborough' as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. This very beautiful hybrid between R. discolor and R. campylocarpum has very large and widely expanded flowers about 3 inches across, creamy-white with a yellow and redspotted throat; the leaves, cordate at the base, are dark green above and whiteglaucous beneath. A pink form resulting from the same cross was also shown

but failed to obtain an award.

Award of Merit.

To Rhododendron venator as a hardy flowering shrub (votes 10 for), from the Hon. Henry McLaren, Bodnant. This is a dwarf new species, named by Mr. H. F. Tagg, raised from K.W. 6285. It forms a bush about 1½ foot high, with oblanceolate somewhat bullate leaves, dark green above, slightly glaucous below and up to 6 inches long. The tubular reddish-orange flowers hang down on glandular pedicels (in 6-11 flowered clusters) below the level of the upper leaves.

To Rhododendron K.W. 7108 (later confirmed as R. brevistylum by Mr.]. Hutchinson), as a flowering shrub (votes 11 for), from J. J. Crosfield, Esq., Kensington. A species with funnel-shaped flowers about 1 inch long, externally pink, internally white with pink spots at base, borne on lepidote red pedicels in compact trusses; the leaves are dark green above, lepidote beneath, and 3 inches or less long.

To Rhododendron nucronatum var. ripense as a flowering shrub (votes 7 for), from the Hon. Henry McLaren. This is apparently the wild Japanese form of the white R. nucronatum, being distinguished by Makino as R. ripense. It has wide-open, very profusely produced flowers of delicate pink, each about 2 inches across and borne solitary or in pairs on hairy \(\frac{1}{2}\)-inch long pedicels at the ends of the bristly shoots. The decidnous leaves are hairy above and below. The plant forms a low spreading bush.

To Rhododendron 'Pauline' as a hardy flowering shrub (votes unanimous),

from Lionel de Rothschild, Esq. A hybrid raised by T. Lowinsky, Esq., with large rounded trusses of funnel-shaped crimson flowers each about 2 inches across;

leaves up to 8 inches long, 2 inches across.

June 7, 1933, Mr. G. W. E. LODER, F.L.S., in the Chair, and thirteen other members present.

Awards Recommended:-

Award of Merit.

To Rhododendron 'Azor' as a hardy flowering shrub (votes 9 for), from J. B. Stevenson, Esq., Ascot. A hybrid of R. Griersonianum and R. discolor, with large trumpet-shaped flowers, externally pubescent and about 3 inches long, like those of R. Griersonianum but pink with ruddy brown frecklings towards the base; they are borne in loose trusses; the dark green leaves are up to 7 inches long and 2 inches across.

To Rhododendron 'Ladybird' as a hardy flowering shrub (votes unanimous), from L. de Rothschild, Esq., Exbury. A hybrid (\tilde{R} . discolor \times R. Corona with pink widely expanded flowers, each about 31 inches across, prettily freckled with yellow on the inside and the petals slightly frimbriate, in many-flowered rounded heads about 6 inches across; leaves elliptic, up to 7 inches long, 3 inches

June 20, 1933, Mr. E. H. WILDING in the Chair, and eleven other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron 'Arthur Osborn' as a hardy flowering shrub (votes unanimous), from the Director, Royal Botanic Gardens, Kew. This attractive hybrid between R. Griersonianum and R. didymum was raised at Kew in 1929. It has trumpet-shaped horizontal or pendulous ruby-coloured flowers about $i\frac{1}{2}$ inch across, borne in loose trusses on glandular pedicels; it begins to bloom when only a foot or so high. The narrowly elliptic or oblanceolate leaves are up to 3 inches long, with a close fawn tomentum beneath. The plant was exhibited as R. Osbornii, a name previously used for another hybrid (Floricult. Cab. VII, t. facing p. 168).

To Rhododendron 'Mrs. Leopold de Rothschild 'as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. Another hybrid from R. Griersonianum, having widely expanded trumpet-shaped flowers about 2 inches across, light red spotted with fawn, in rounded many-flowered trusses. The very narrowly elliptic leaves are up to 9 inches long, 2 inches broad, glabrous on both surfaces, dark green above, lighter below.

June 27, 1933, Mr. G. W. E. LODER, F.L.S., in the Chair, and nine other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron K.W. 6257 (subsequently named R. Keysii var. unicolor Hutchinson) as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. This is hardier than the original R. Keysii from Bhutan. It was raised in 1926 from Kingdon Ward's 6257 collected in Pemako, south-east Tibet, where it forms a slender shrub 8-10 feet high. The tubular flowers, 3 to 4 inch long, are an almost uniform Carthamus red (Rep. Coul., p. 88), the tips of the short erect rounded petals being slightly yellowish; the style is almost or quite glabrous at base. The flowers hang down in short-pedicelled 2-6 flowered lateral clusters. The elliptic to narrowly lanceolate leaves are up to 6½ inches long, 1½ inch broad, dark green above, lighter green and more closely lepidote beneath. It is an attractive and unusual plant.

ORCHID COMMITTEE.

March 7, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen other members present.

Awards Recommended:-

Gold Medal.

To Messrs. H. G. Alexander, Tetbury, for Cymbidiums.

Silver-gilt Banksian Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Banksian Medal.

To E. R. Ashton, Esq., Broadlands, Tunbridge Wells, for a group. To Messrs. Sander, St. Albans, for a group.

First-class Certificate.

To Cymbidium × 'Jungfrau' (Alexanderi × 'Eagle') (votes 11 for, 4 against), from Messrs. H. G. Alexander. A large white flower with a few minute purple dots at the base of the sepals and petals, the labellum marked with red-

purple at the apex.

To Miltonia × 'Memoria H. T. Pitt' var. 'Exquisita' ('Princess Mary' × 'Wm. Pitt') (votes unanimous), from Robert Paterson, Esq., Stonehurst, Ardingly. A lovely flower of rich crimson and deep rose colouring; the labellum has an

orange-coloured base.

Award of Merit. To Vuylstekeara x 'Ruby Sinclair,' Clovelly var. (Odontioda x 'Colombia' x V. × ignescens) (votes 13 for, 3 against), from Frank Mercer, Esq., Steyning, Sussex.

Sepals and petals of bright cerise-red, the labellum with a bright rose apex.

To Cymbidium × 'Cynthia' var. 'Charm' ('Goosander' × 'Redshank')
(votes 12 for), from Messrs. H. G. Alexander. Sepals and petals blush-white,

the labellum with a bright rose-pink apex.

To Cymbidium x 'Olympus' var. albens (Alexanderi x 'Vesta') (votes unanimous), from Messrs. McBean, Cooksbridge. Flowers pure white, except for a few purple dots at the base of the column and a cream-coloured ridge on the labellum.

Preliminary Commendation.

To Odontonia x 'Tyana' var. 'Princess' (Odontoglossum x 'St. James' x Odontonia x 'Nesta') (votes 13 for), from Messrs. Charlesworth. A large flower of rich reddish colour.

Cultural Commendation.

To Mr. C. V. Kent, Orchid grower to E. R. Ashton, Esq., Broadlands, Tunbridge Wells, for Dendrochilum glumaceum, with fifty flower-spikes.

To Mr. John Bands, Orchid grower to F. Mercer, Esq., for Oncidium cheirophorum, with fourteen flower-spikes.

Other Exhibits.

Messrs. Black & Flory, Slough: Cypripedium hybrids. Messrs. Harry Dixon, Wandsworth Common: various Orchids.

Messrs. McBean, Cooksbridge: various Orchids.

Messrs. Stuart Low, Jarvis Brook: various Orchids.

Messrs. A. J. Keeling, Bradford: various Orchids. Sir Jeremiah Colman, Bt., Gatton Park, Reigate: *Brassocattleya* × 'Gatton Lily.'

Dr. F. Craven Moore, Duckyls, East Grinstead: Cypripedium × Maudiae. Messrs. Burstow, Haywards Heath: Cymbidium × 'Vallant.'

F. J. Hanbury, Esq., East Grinstead: Cymbidium x 'Erica Sander.'

March 21, 1933, Sir Jeremiah Colman, Bt., in the Chair, and sixteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Black & Flory, Slough, for a group.

First-class Certificate.

To Cymbidium × 'Mirabel' ('Flamingo' × 'Petrel') (votes 15 for, 2 against), from Messrs. H. G. Alexander, Tetbury. Flowers of large size, light green suffused with cream, the labellum marked with crimson on the apical lobe. Award of Merit.

To Odontioda × 'Nanette' var. 'Carmine' ('Zampa' × 'Zenobia') (votes 9 for, 3 against), from Messrs. Charlesworth. Flowers of medium size, round and

To Coelogyne pulchella, from Sir Jeremiah Colman, Bt., Gatton Park, Reigate (votes unanimous). An attractive species with erect spikes of white flowers, the lip bearing a red-brown blotch.

Preliminary Commendation.

To Odontoglossum x 'Plumptosolon' var. rotundum ('crispo-Solon' x plumptonense) (votes unanimous), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. An immature seedling with large flowers of round shape, the segments heavily blotched with red.

Cultural Commendation.

To Mr. B. F. Perfect, Orchid grower to Sir Jermiah Colman, Bt., for Coelogyne pulchella, bearing fifteen flower-spikes. Other Exhibits.

Messrs. Sander, St. Albans: Cymbidiums.
Messrs. Stuart Low, Jarvis Brook: various Orchids.
Messrs. Armstrong & Brown, Tunbridge Wells: various Orchids.

Messrs. Harry Dixon, Wandsworth Common: various Orchids. S. G. Brown, Esq., Shepperton: Odontioda × 'Grenadier.'

Lionel de Rothschild, Esq., Exbury: Catasetum barbatum.

Robert Paterson, Esq., Ardingly: Brassocattleya × 'Grand Monarque.' Frank Mercer, Esq., Steyning: Odontonia × 'Talpa.' Messrs. McBean, Cooksbridge: Brassocattleya × 'Cliftonville.'

April 4, 1933, Sir Jeremiah Colman, Bt., in the Chair, and nineteen other members present.

Awards Recommended:

Silver Banksian Medal.

To Messrs. H. G. Alexander, Tetbury, for a group. To F. J. Hanbury, Esq., East Grinstead, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

First-class Certificate.

To Oncidium superbiens var. magnificum (votes 15 for, 3 against), from Messrs. McBean, Cooksbridge. The plant had been raised from seed in this country and is noteworthy for the rich coloration of the flowers, thirty-three of which were carried on a long twining spike.

To Cymbidium x Olympus' var. 'Emperor' (Alexanderi x 'Vesta') (votes 12 for, 5 against), from Messrs. H. G. Alexander. Spike of a dozen unusually large flowers, creamy-white, the labellum marked with red on the

front lobe.

Award of Merit.

To Cymbidium x 'Grosvenor' (parentage?) (votes unanimous), from Gus Mayer, Esq., Wistlers Wood, Woldingham. Pale buff-yellow with a golden flush, the labellum having a white apex with a few red spots.

Preliminary Commendation.

To Miltonia × 'Limelight' (Armstrongii × 'Lycaena') (votes unanimous), from R. Paterson, Esq. Sepals and petals crimson, labellum rosy-crimson.

To Odonloglossum × 'Viceroy' ('crispo-Solon' × 'Victory') (votes 15 for), white the property of th

from R. Paterson, Esq. Well formed, with red-brown markings on a white ground.

To Odontioda × 'Japetus' (Odontioda × 'Rubicon' × Odontoglossum × 'Orthus') (votes 13 for), from F. J. Hanbury, Esq. Round and of solid-red colour. Cultural Commendation.

To Mr. A. Merry, Orchid grower to R. Paterson, Esq., for Odontoglossum

coronarium, with a spike of thirty flowers.

To Mr. J. Bands, Orchid grower to F. Mercer, Esq., Steyning, for Odonto-glossum crispum var. 'Gladys Mercer,' with a spike of fourteen large flowers. Other Exhibits.

Messrs. Sander, St. Albans: group of Orchids.

Messrs. Stuart Low, Jarvis Brook: group of Orchids. Messrs. Black & Flory, Slough: group of Orchids.

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Messrs. McBean, Cooksbridge: group of Orchids.

Messrs. Harry Dixon, Wandsworth Common: group of Orchids.

Mr. C. J. Ellis, Weston, Somerset: Odontoglossum hybrids.

April 25, 1933, Sir Jeremiah Colman, Bt., in the Chair, and fourteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a large group of Odontoglossums.

First-class Certificate.

To Odontoglossum × 'Alorcus' var. 'Purity' (crispum × 'Llewellyn') (votes 11 for, 1 against), from Messrs. Charlesworth. Flowers large and well formed, white with an occasional crimson blotch. Award of Merit.

To Odontoglossum x 'Toreador' var. 'Princess Mary' (crispum x 'Laurentia') (votes unanimous), from Messrs. Charlesworth. The large flowers are white,

shaded with rose, and bear crimson blotches.

To Miltonia x pulchra var. 'Bright Eyes' ('Lycaena' x 'Wm. Pitt') (votes 10 for, 1 against), from R. Paterson, Esq. Velvety crimson, except for

the base of the labellum, which is yellow edged with white.

To Cymbidium × 'Auk' var. 'Majestic' ('Landrail' × Pauwelsii) (votes unanimous), from Messrs. McBean. Flowers cream shaded with rose, the lip margined with light crimson.

To Cymbidium x 'Thelma' var. 'Empress' (Alexanderi x 'Redshank') (votes 9 for, 3 against), from Messrs. McBean. Sepals and petals white, labellum

marked with red.

To Cymbidium × 'Dorchester,' Low's var. (Alexanderi × 'Tityus') (votes 11 for, 1 against), from Messrs. Stuart Low, Jarvis Brook. Flowers round, white, except for the rose-shaded column.

Vote of Thanks.

- To Messrs. McBean, Cooksbridge, for a group.
- To Messrs. H. G. Alexander, Tetbury, for a group.

To Messrs. Stuart Low, for a group.

- To Messrs. Harry Dixon, Wandsworth Common, for a group. Other Exhibits.
- M. L. Wells, Esq., Chiddingfold, Surrey: Odontoglossum x 'St. Hilda' var. 'Radiant.'

Robert Paterson, Esq.: Cattleyas and Miltonias.

May 9, 1933, Sir Jeremiah Colman, Bt., in the Chair, and sixteen other members present.

Awards Recommended :-

Cultural Commendation.

To Mr. A. Merry, Orchid grower to R. Paterson, Esq., for *Miltonia* × 'Lycaena,' Stamperland var. ('Princess Margaret' × 'Lord Lambourne'). Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group. To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Harry Dixon, Wandsworth, for a group.

Other Exhibit.

Robert Paterson, Esq.: Miltonia hybrids.

May 23, 1933 (at Chelsea), Sir JEREMIAH COLMAN, Bt., in the Chair, and sixteen other members present. Awards Recommended:-

First-class Certificate.

To Miltonia x 'Bruges' var. 'Freda Sander' ('Lycaena' x 'Princess Astrid') (votes unanimous), from Messrs. Sander, St. Albans. Of large size and bright ruby-crimson colour, the labellum having a yellowish mask at the

To Odontoglossum x 'Toreador' var. 'Defiance' (crispum x 'Laurentia') (votes 10 for, 4 against), from R. Paterson, Esq. Of thick texture and well-

formed, white with reddish markings.

To Brassocattleya × 'Molly Thayer' var. 'Cupid' (B.-c. × 'Heatherwood' × C. × 'Chelsea') (votes 9 for, 4 against), from Messrs. Black & Flory, Slough. A large and charming flower, pale mauve, mottled with rose, the labellum goldenyellow margined with purplish-mauve.

Award of Merit.

To Ansellia africana var. nilotica (votes unanimous), from Messrs. Sander.

Numerous tawny-yellow flowers barred with chocolate-red.

To Dendrobium Sanderae, Gatton Park var. (votes unanimous), from Sir Jeremiah Colman, Bt., Reigate. This fine form has large white flowers, the

To Miltonia × pulchra var. 'Queen Mary' ('Lycaena' × 'Wm. Pitt') (votes 11 for, 4 against), from R. Paterson, Esq. Bright crimson-red.

To Cymbidium × 'Golden Dawn' ('Castor' × Woodhamsianum) (votes 10 for, 1 against), from Messrs. Armstrong & Brown, Tunbridge Wells. Golden-

green, the labellum bordered with red-brown.

To Cymbidium × 'Dorchester' var. 'Catherine Armstrong' (Alexanderi × 'Tityus') (votes unanimous), from Messrs. Armstrong & Brown. A well-formed flower, ivory-white with a few red-brown spots on the lip.

To Brassolaeliocattleya x flavida var. superba (B.-l.-c. x 'Amber' x L.-c. x 'Golden Queen') (votes unanimous), from Baron Bruno Schröder, Englefield

Green. Sepals and petals yellow, labellum salmon-rose.

To Sophrolaeliocatileya × 'Chelsea' (C. × 'Chelsea' × S.-l.-c. × 'Memoria J. Charlesworth') (votes unanimous), from Messrs. Black & Flory. Sepals and

petals purplish-mauve, labellum royal purple.

To Cymbidium × 'Dora' var. 'Golden Queen' ('Bullfinch' × 'Wheatear')
(votes 10 for, 5 against), from Messrs. H. G. Alexander, Tetbury. Round, golden-green flowers, the labellum margined with reddish crimson.

Preliminary Commendation.
To Odontoglossum × 'Jennifer' var. 'Juno' ('Omega' × 'Sheila Stephenson'), from Messrs. McBean, Cooksbridge. Flowers well-formed and of pleasing colour.

Cultural Commendation.

To Mr. A. Merry, Orchid grower to R. Paterson, Esq., for Miltonia × 'Wm. Pitt,' Stamperland var., with six flower-spikes.

To Messrs. McBean, for Cymbidium x 'Ceres' var. 'F. J. Hanbury' with

four flower-spikes.

To Messrs. Charlesworth, Haywards Heath, for a grand specimen of Brasso-

cattleya x 'Tilly' with a dozen large flowers.

To Messrs. Armstrong & Brown, for a fine plant of Selenipedilum × macrochilum with nine flowers.

June 7, 1933, F. J. HANBURY, Esq., in the Chair, and eight other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

Award of Merit.

To Millonia × 'Mrs. J. B. Crum 'var. 'Rotunda' ('Lycaena' × 'Princess Mary') (votes unanimous), from R. Paterson, Esq. Sepals and petals flushed and labellum stained with rose-red.

To Brassocattleya × 'Eva Hannington' (B.-c. × 'Mrs. R. Paterson' × C. x 'Tityus') (votes 6 for, I against), from Messrs. Black & Flory. A large and pleasing rosy-mauve flower, the front lobe of the labellum rich purple.

Preliminary Commendation.

To Odontolgossum x 'Brimstone Butterfly' (crispum x Armstrongii) (votes unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. A promising seedling with a rich yellow flower.

Other Exhibits.

Messrs. McBean, Cooksbridge: Odontoglossum crispum. Messrs. Sander, St. Albans: Laeliocattleya × 'Tenemos.'

June 20, 1933, F. J. HANBURY, Esq., in the Chair, and thirteen other members present.

Awards Recommended:— Gold Medal.

To R. Paterson, Esq., Ardingly, for Miltonias.

Award of Merit.

To Milionia × 'Amanda,' 'Clovelly' var. (pulchra × 'Wm. Pitt') (votes unanimous), from F. Mercer, Esq., Steyning, Sussex. Deep ruby-crimson, the labellum shaded with crimson on a rose ground.

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To Odontonia \times Charlesworthii var. 'Rex' (M. vexillaria \times Odontoglossum \times Uro-Shinneri) (votes 7 for, 3 against), from F. Mercer, Esq. The outstanding

feature is the large purplish-rose labellum.

To Millonia x 'Mrs. J. B. Crum' var. 'Papilio' ('Lycaena' x 'Princess Mary') (votes 10 for, 1 against), from R. Paterson, Esq. Sepals flushed with rose, petals ruby-crimson, labellum rose shaded with crimson.

To Sophrolaeliocattleya x 'Mikado' var. magnifica (C. x 'Empress Frederick' × S.-l.-c. × 'Prince Hirohito') (votes 12 for, 1 against), from Baron Schröder, Englefield Green, Surrey. Petals golden-orange, labellum ruby-red with golden veins in the throat area.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group of species and hybrids.

June 27, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and ten other members

No awards were made on this occasion.

Messrs. Armstrong & Brown, Tunbridge Wells, exhibited Sarcopodium Lyonii.

July 4, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

Preliminary Commendation.

To Odontoglossum x 'Diophon' ('Omega' x 'Purple Emperor') (votes unanimous), from Messrs. Charlesworth, Haywards Heath. A large flower, heavily blotched with maroon-purple. Other Exhibits.

Messrs. Charlesworth, Haywards Heath: group of Orchids.

Messrs. Black & Flory, Slough: *Miltonia* hybrids. R. Paterson, Esq., Ardingly: *Miltonia* × 'Vida' and M. × 'Petunia' var. 'The King.'

July 18, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and seven other members present.

Awards Recommended :-

Cultural Commendation.

To Messrs. Charlesworth, Haywards Heath, for Miltonia x gattonensis var. 'Avalanche,' with three spikes and a total of nineteen flowers. Other Exhibits.

Messrs. Charlesworth, Haywards Heath: group of Orchids.

Messrs. Stuart Low, Jarvis Brook: group of Orchids.

August 1, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and nine other members present.

No awards were made on this occasion.

Exhibits.

Messrs. Charlesworth, Haywards Heath: species and hybrids.

Messrs. Sander, St. Albans: several uncommon species.

August 15, 1933, Mr. F. J. Hanbury in the Chair, and eight other members present.

No awards were made on this occasion.

Cultural Commendation.

To Mr. Savegur, gardener to Dame Alice Godman, South Lodge, Horsham, for Disa grandiflora, with two spikes bearing a total of eight flowers. Exhibit.

Messrs. Charlesworth, Haywards Heath: a few hybrids.

NARCISSUS AND TULIP COMMITTEE.

February 7, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended:-

Award of Merit.

To Narcissus 'Eva' as a market variety for forcing and as a variety for cultivation in pots, pans or bowls (votes unanimous). This Incomparabilis variety (Division 2a) received an A.M. as a variety for exhibition on April 15, 1930 (see JOURNAL R.H.S., 56, p. lii). Shown by Mr. W. Dent, Moulton, Spalding, Lincs.

Other Exhibits.

No other plants were submitted for certificate, and there were no groups for consideration.

February 21, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twelve other members present.

There were no groups for the Committee's consideration and only one plant was submitted for certificate, viz. Narcissus 'Golden Champion,' shown by Mr. R. F. Calvert, Coverack, Cornwall.

March 7, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Carter's Tested Seeds, Raynes Park, for Tulips.

To Messrs. J. R. Pearson, Lowdham, for Daffodils and Tulips in bowls. Banksian Medal.

To Mr. R. F. Calvert, Coverack, Cornwall, for Daffodils.

Other Exhibits.

Sir Daniel Hall showed, on behalf of Miss H. Schafer, two pots containing a number of plants of Narcissus asturiensis and one of N. Bulbocodium collected in the Picos de Europa, Province of Santander, Northern Spain, in 1931.

Captain H. G. Hawker showed a hybrid between N. cyclamineus and N. minimus.

March 21, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-

Silver-gilt Banksian Medal. To Mr. J. L. Richardson, Prospect House, Waterford, for Daffodils.

Silver Banksian Medal.

To Messrs. Carter's Tested Seeds, for Daffodils.

To Mr. R. F. Calvert, for Daffodils. To Messrs. R. H. Bath, Wisbech, for Tulips.

To Messrs. Barr, 13 King Street, Covent Garden, for Daffodils.

To the Donard Nursery Company, Newcastle, Co. Down, for Daffodils. Banksian Medal.

To Mr. Guy L. Wilson, Broughshane, co. Antrim, for Daffodils.

Award of Merit.

To Narcissus 'Perth' as a show flower (votes unanimous). A well-formed Incomparabilis (Division 2a) with large flowers 4 inches in diameter. The pale primrose-yellow perianth segments were smooth, broad and overlapping, and the self-coloured yellowish orange cup was half the length of the perianth segments and pleated at the margin. Raised by the Brodie of Brodie and shown by Mr. J. L. Richardson.

To Narcissus 'Bonython' as a show flower (votes 12 for, o against). refined, well-poised bicolor trumpet variety (Division 1c) having sulphury white perianth segments and a soft sulphur-yellow trumpet with a reflexed margin. Raised by Mr. P. D. Williams and shown by Mr. J. L. Richardson.

Plants referred to Scientific Committee. Narcissus Watieri, a dainty white-flowered species from the High Atlas, shown by Mr. G. P. Baker, Sevenoaks, was referred to the Scientific Committee (see p. viii).

April 4, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Gold Medal.

To Mr. J. L. Richardson, for Daffodils.

Silver Banksian Medal.

To Messrs. Barr, for Daffodils.

Banksian Medal.

To Mr. R. F. Calvert, for Daffodils.

Award of Merit. To Narcissus 'Lidcot' as a show flower (votes unanimous). A bicolor Barrii variety (Division 3b) with flowers 4 inches in diameter. The white perianth segments were broad, overlapping and smooth, and the saucer-shaped cup, which was about two-sevenths the diameter of the flower, was pale gamboge yellow passing to orange cadmium at the indented rim. Raised by Mrs. R. O.

Backhouse and shown by Mr. J. L. Richardson, Prospect House, Waterford.

To Narcissus 'Marksman' as a show flower and as a variety for cutting (votes unanimous). A brightly coloured, clear-cut, medium-sized Incomparabilis variety (Division 2a). The pale chrome-yellow perianth segments were smooth and overlapping, and the corona, which was definitely cup-shaped and just over helf the leasth of the compared was a surface of surface of the compared with the leasth of the compared was a surface of surface of the compared with the leasth of the compared with the co and just over half the length of the segments, was a medium shade of orange cadmium, becoming paler at the centre. Raised by Miss Evelyn and shown by Mr. J. L. Richardson.

Varieties to be seen again.

The Committee expressed the desire to see 'Fortune's Sun' and 'Fortune's Pride,' two Daffodils exhibited by Mr. R. F. Calvert, at a future meeting.

April 11, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twenty-one other members present, with one visitor.

The Peter Barr Memorial Cup.

On a proposal from Mr. Curtis, it was unanimously recommended that the Peter Barr Memorial Cup be awarded to Mr. G. L. Wilson. Awards Recommended:

Gold Medal.

To Mr. J. L. Richardson, Prospect House, Waterford, for Daffodils.

To Messrs. Barr, 13 King Street, Covent Garden, for Daffodils. To Messrs. F. Rijnveld, Hillegom, Holland, for Daffodils.

Silver-gilt Flora Medal.

To the Donard Nursery Co., Newcastle, co. Down, for Daffodils. To Mr. G. L. Wilson, Broughshane, co. Antrim, for Daffodils. Silver-gilt Banksian Medal.

To Mr. R. F. Calvert, Coverack, Cornwall, for Daffodils.

Silver Flora Medal.

To Messrs. R. H. Bath, Wisbech, for Daffodils.

To Messrs. Dobbie, Edinburgh, for Daffodils.

To Messrs. A. C. van der Schoot, Hillegom, for Daffodils. Silver Banksian Medal.

To Messrs. J. R. Pearson, Lowdham, for Daffodils. To Messrs. L. van Leeuwen, Sassenheim, for Daffodils.

To Mr. J. C. Martin, Truro, for Daffodils. To Mr. W. A. Watts, St. Asaph, for Daffodils.

Flora Medal.

To Messrs. Wakeley, Bankside, S.E. 1, for Daffodils.
To Messrs. D. Stewart, Ferndown, Dorset, for Daffodils.

To Messrs. H. Prins, Wisbech, for Daffodils.

To Mr. H. G. Longford, Abingdon, Berks, for Daffodils. To Mr. A. K. Watson, Upton, Norfolk, for Daffodils.

First-class Certificate.

To Narcissus 'Engleheart's White Rose 'as a variety for show (votes 15 for). This beautiful, pure white, double variety (Division 10) received a Certificate of Preliminary Recognition as a show flower on April 26, 1927 (see JOURNAL R.H.S. 53, p. lxxvii). Raised by Rev. G. H. Engleheart and shown by Mr. F. A. Secrett, Walton-on-Thames.

Award of Merit.

To Narcissus 'Eva' as a variety for cutting (votes unanimous). This wellformed bicolor Incomparabilis variety (Division 2b) received an A.M. as a show flower on April 15, 1930 (see Journal R.H.S., 56, p. lii), and an A.M. as a market variety for forcing and as a variety for cultivation in pots, pans or bowls on February 7, 1933 (see p. xlv). Shown by Mr. W. Dent, Moulton, Spalding.

To Narcissus 'Engleheart's Carnation' as a show flower (votes 14 for, 5 against). A sulphury white, fully double variety (Division 10), with regularly arranged segments suggestive of a border carnation. Raised by Rev. G. H.

Engleheart and shown by Mr. F. A. Secrett, Walton-on-Thames.

To Narcissus 'Daisy Schäffer' as a show flower (votes 15 for, 2 against). A Leedsii variety (Division 4a) with flowers 4½ inches in diameter. The broad perianth segments were greenish-white and the frilled corona was pale sulphuryellow, passing to white at the base. Raised by Messrs. de Graaff Bros. and shown by Messrs. Warnaar, Sassenheim, Holland.

To Narcissus 'Clonmel' as a show flower (votes unanimous). A shapely,

well-formed trumpet variety with primrose-yellow perianth segments and a trumpet of a deeper shade, recurved at the mouth. Raised and shown by

Mr. G. L. Wilson, Broughshane, co. Antrim.

To Narcissus 'Market Merry 'as a show flower (votes 12 for). A well-formed Barrii variety (Division 3a) with flowers nearly 4 inches in diameter. The perianth segments were primrose-yellow, and the self-coloured orange cadmium cup was nearly one-third the length of the perianth segments. Raised by the

Brodie of Brodie and shown by Mr. G. L. Wilson.

To Narcissus 'Invergordon' as a show flower (votes 18 for). An Incomparabilis variety (Division 2a) with broad, overlapping, pale sulphur-yellow perianth segments, and a wide-mouthed, rather irregularly margined cup, half the length of the segments, chiefly orange cadmium in colour, but a little paler at the centre. Raised by the Brodie of Brodie and shown by Mr. G. L. Wilson. To Narcissus 'Varna' as a show flower (votes unanimous). A neat Barrii

variety (Division 3a) of medium size. The smooth, overlapping but rather pointed perianth segments were pale sulphur-yellow, and the well-formed cup, which was nearly one-third the length of the perianth segments, was saturnine red passing to golden yellow at the centre. Raised by the Brodie of Brodie and shown by Mr. G. L. Wilson.

To Narcissus 'Porthilly' as a show flower (votes 17 for). A richly coloured

Incomparabilis variety (Division 2a) with flowers nearly 4 inches in diameter. The broad, smooth, overlapping perianth segments were primrose-yellow, and the funnel-shaped cup, which was half the length of the segments, was self-coloured orange cadmium. Raised by Mr. P. D. Williams and shown by Mr. J. L. Richardson, Prospect House, Waterford.

Award of Merit (after trial at Wisley).

To Narcissus 'Elspeth' (Division 2b). Stem 16 inches; flower well posed; perianth 3 inches diameter, flat, segments irregular, reflexed, overlap for twothirds of their length, creamy white; corona ½ inch deep, basin-shaped, sulphur narrowly edged with orange. Bulb of medium size, rapid of increase, free flowering. April 21 to May 1. Sent by the raiser, Mr. P. D. Williams, Lanarth, St. Keverne.

To Narcissus 'Havelock' (Division 2a). Stem 16 inches; flower well posed; perianth 3% inches diameter, flat, segments overlap for half of their length, primrose with white tips; corona I inch deep, funnel-shaped, pale buttercupyellow, mouth frilled. Bulb of medium size. April II to May I. This variety received an A.M. as a variety for exhibition, March 22, 1927, and an A.M. as a variety for cutting, March 24, 1931. Sent by the raiser, Mr. P. D. Williams.

To Narcissus 'St. Erme' (Division 4a). Vigorous; stem 18 inches; flower inclined to droop; perianth 4 inches diameter, segments flat, overlap for half of their length.

of their length, cream; corona $\mathbf{1}_{\frac{1}{8}}$ inch diameter, $\mathbf{1}_{\frac{1}{4}}$ inch deep, sulphur. Bulb of medium size, rapid of increase, free flowering. April 14 to May 7. Sent by the raiser, Mr. P. D. Williams.

April 24, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and eleven other members

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. G. L. Wilson, for Daffodils.

Silver Banksian Medal.

To Messrs. Barr, for Tulips and Daffodils.

Banksian Medal.

To Messrs. D. Stewart, for Tulips.

Award of Merit.

To Narcissus 'Smyrna' as a show flower (votes unanimous). A well-formed Poeticus variety (Division 9) of great substance. The pure white perianth segments were broad and overlapping, and the rather large corona was orange-scarlet edged with red. Raised by the Brodie of Brodie and shown by Mr. G. L. Wilson.

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To Tulipa Korolkowi var. concolor (votes 6 for). A pretty scarlet-flowered form of the species. Breaking in Tulips.

Sir Daniel Hall showed some broken Tulips in which two apparently distinct types of breaking had occurred. He explained that observation of these two types had led to the theory that there are probably two viruses which cause breaking. The Committee thanked Sir Daniel for the instructive exhibit.

May 9, 1933, Mr. George Monro, C.B.E., in the Chair, and seven other members present. (Although a quorum was not formed it was decided to transact business as usual and report the matter to the Council.)

Awards Recommended :-

Gold Medal.

To Messrs. Barr, Covent Garden, for Tulips.

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Tulips.

Silver Banksian Medal.

To Messrs. R. H. Bath, Wisbech, for Tulips. To Mr. W. A. Watts, St. Asaph, for Tulips. Banksian Medal.

To Messrs. Daniels, Norwich, for Tulips.

To the Rev. H. Rollo Meyer, Watton-at-Stone, Hertford, for Tulips.

To Messrs. A. C. van der Schoot, Hillegom, Holland, for Tulips. To Messrs. Wakeley, Bankside, for Tulips.

Award of Merit. To Tulip 'La Fontaine' as a variety for garden decoration (votes unanimous). A Darwin Tulip with a beautiful aucuba-green base. The outside of the segments was old rose, passing to rosy flesh at the margins. Raised by the late W. T. Ware and shown by Messrs. Barr, Covent Garden.

To Tulip 'White Knight' as a variety for garden decoration (votes unanimous). A white Darwin Tulip with yellow pollen. Raised by the late

W. T. Ware and shown by Messrs. Barr.

May 23, 1933, Sir Daniel Hall, K.C.B., D.Sc., F.R.S., in the Chair, and twelve other members present.

There were no plants for the Committee's inspection.

BOOKS AND PAMPHLETS PRESENTED, PURCHASED OR RE-VIEWED DURING THE HALF-YEAR ENDING JUNE 30, 1933, AND DEPOSITED IN THE LIBRARY.

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I = Purchased.
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Abbreviations.—Col. pls. = coloured plates; illus. = illustrated; rev. = revised; pls. = plates; ed. = editor, edited or edition; n.d. = no date; n.p. = no place (of publication given).

When books are published in London, the place of publication is not named in the entry.

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NOTICES TO FELLOWS.

Renewal of Subscriptions.

Fellows and Associates are reminded that the Annual Tickets are only issued in return for Subscriptions received. All Annual Subscriptions are payable on the First day of January of each year. Cheques and Postal Orders (made out in Guineas, not Pounds) should be made payable to "The Royal Horticultural Society" and crossed "Westminster Bank, Victoria Branch, S.W. 1."

Early Market Produce Show.

The 1934 Early Market Produce Show, the object of which is to encourage the home production of early fruits and vegetables, will be the third of its kind to be held, and will take place in the Old Hall, Vincent Square, on April 17 and 18.

On the afternoon of April 17, at 3.30 P.M. in the Lecture Room, there will be a discussion on

"QUALITY OF EARLY VEGETABLES,"

to be opened by Dr. Bewley, of the Experimental and Research Station, Cheshunt, followed by speakers taking the points of view of the Chef, the Housewife, the Retailer, the Distributor, and the Grower.

Schedules and particulars may be obtained from the Secretary of the Royal Horticultural Society, Vincent Square, S.W. I.

Garden Demonstrations at Wisley in 1934.

Practical demonstrations of garden operations will be held from 2 P.M. to 4 P.M., weather permitting, as follows:

Mar. 14, 15. Seed-sowing—Indoors and Outdoors.

" 21, 22. Rose Pruning.

Apr. 11, 12. Spring Spraying of Fruit Trees.

July 18, 19. Summer Pruning of Fruit Trees.

Nov. 14, 15. Planting Fruit Trees and Roses.

Dec. 5, 6. Pruning Fruit Trees.

Fellows desiring to attend the practical demonstrations are asked to notify the Director, R.H.S. Gardens, of their intention beforehand.

Chelsea Flower Show.

The Great Spring Flower Show at Chelsea will be held on May 30, 31, and June 1. Fellows and Associates desiring to avoid the crowded hours are recommended to visit the Show early, before 11 o'clock, or in the late hours of the afternoon, say, after about 5.30.

IXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

The Great Autumn Show.

The Great Autumn Show will be held at the Crystal Palace on September 19 to 22. On this occasion the usual competitive Fruit and Vegetable Show, and a Conference on Apples and Pears, will be held there.

Schedules are obtainable from the Secretary.

Fruit Conference.

A Conference on Apples and Pears will be held at the Crystal Palace during the Great Autumn Show on Wednesday, Thursday, Friday and Saturday, September 19, 20, 21 and 22.

All Fellows interested are invited to attend the Conference, and should apply to the Secretary for particulars.

Local Varieties of Apples and Pears.

On the occasion of the Fruit Conference a Committee will sit to clear up outstanding matters of Classification and Nomenclature. For this purpose a special exhibition of Apples and Pears is being arranged, and every effort is being made to obtain a collection of local varieties not usually seen and other than the usual varieties listed in Nurserymen's Catalogues. The Secretary would be glad to receive lists of local varieties that might be obtainable.

Fortnightly Shows.

Fellows' and Associates' attention is drawn to the alteration in the hours of the two days' Shows. They will be closed at 7.30 on the first day instead of 9 P.M.

Small Exhibits from Fellows.

It frequently happens that a Fellow who has insufficient plants to stage a group at a Fortnightly Show would like other Fellows to see some particular plant which he has in bloom. The Council cordially invites such exhibits, which are often of great interest. Any Fellow who wishes to stage an exhibit consisting of not more than three pots, pans, or vases may do so although he has not applied for space beforehand. Such exhibits should be entered with the clerk at the Small Exhibits Table by noon on the morning of the Meeting, and he will provide exhibitors' cards and stage the exhibits.

The Lily Group.

Many Fellows interested in Lilies, Nomocharis and Fritillaries having expressed a wish for facilities to meet and exchange views, the Council has established a Lily Group. A series of meetings was held in 1933, and the programme for 1934 can be obtained on application to the Secretary.

Membership of the Group is open to all Fellows and Associates without any additional subscription, and all Members of the Group are notified by post of Group Meetings. Those who wish to join the Lily Group should apply in writing to the Secretary.

Exhibits of Lilies.

Exhibits of Lilies are always welcome at the Society's Fortnightly Meetings, but the Council hopes that they will be a special feature of the Fortnightly Show to be held on Tuesday and Wednesday, July 10 and 11, 1934. A Banksian Medal is offered for award on that occasion to the amateur who exhibits the best new hybrid Lily. Full particulars may be had on application to the Secretary.

The attention of amateurs is also drawn to the new classes for Lilies in the schedule of the Amateurs' Flower Show which will be held on June 19, 1934, schedules of which may be had on application to the Secretary.

The 1935 Daffodil Conference.

In April 1935 a Conference on Daffodils will be held in conjunction with the Annual Daffodil Show.

The programme is now being arranged, and those who would like to receive copies are asked to notify the Secretary.

Reduced Railway Fares Facilities.

The Railway Companies are continuing to issue up to December 31, 1934, between all principal points on any day, tickets, available for return on any day within one calendar month, at the ordinary single fare and a third for the double journey. Fractions of 3d are reckoned as 3d, and the minimum first-class fare is 4s, the third-class 2s. 6d.

This will obviate the issue of special fare vouchers.

Inspection of Fellows' Gardens.

The inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz. a fee of £3 3s. for one day (or £5 5s. for two consecutive days) together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Should two or more Fellows residing in the same district, with their Gardens within easy reach of one another, desire to have the services of the Garden Inspector, arrangements will be made for such a combined inspection, and the fee and expenses divided by consent of those concerned. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their Garden. Gardens can only be inspected at the written request of the owner.

IXXX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Coloured Postcards.

Many of our members have no doubt been impressed recently by the selection of coloured postcards of plants in the Royal Botanic Gardens, Kew, which have been exhibited at our publications counter. The majority of these are "portraits" of individual flowers reproduced by colour photography, and are of particular interest to horticulturists both as accurate representations of the plants concerned and as a highly appropriate means of communication. There are over a hundred cards in all, including the majority of the choicer plants, both hardy and tender, now being grown at Kew. The full collection may be seen at the Publications Kiosk in the Gardens, and a list can be obtained on application to the Director.

In addition to the portraits of individual plants there is a number of general views of the Gardens, including the Bluebells in the Queen's Cottage Grounds, the Daffodils, the Iris Garden, the Palm House, Rock Garden, and Main Gate. For the last three cards the most modern colour-photography process has been used, and the result is three most attractive and colourful landscapes.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

The state of the s

GENERAL MEETINGS.

SEPTEMBER 12, 1933.

SEWELL MEDAL COMPETITION.

The Sewell Medal offered for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house, shown by an amateur, was awarded to Mr. Mark Fenwick, Abbottswood, Stow-on-the-Wold.

A lecture was given by Mr. R. G. Hatton, C.B.E., V.M.H., on "Some Important Considerations in Modern Commercial Fruit Planting" (p. 18). Chairman, Sir Daniel Hall, K.C.B., LL.D., Sc.D., F.R.S.

SEPTEMBER 27-29, 1933.

GREAT AUTUMN SHOW.

NATIONAL HALL, OLYMPIA.

AWARDS.

The Coronation Cup, for the best exhibit in the Show. To Messrs. Sutton, Reading, for vegetables. The Wigan Cup, for the best exhibit of Roses.

To Messrs. Alex. Dickson, Newtownards.

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for Orchids.

To Messrs. Alex. Dickson, Newtownards, for Roses. To Messrs. Sutton, Reading, for vegetables.

To Messrs. J. C. Allgrove, Slough, for fruit. To Messrs. Dobbie, Edinburgh, for potatos.

To Messrs. L. R. Russell, Richmond, for Clematis, Vines, and other shrubs, and stove and greenhouse plants.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

To Messrs. Dickson & Robinson, Manchester, for Dahlias.

Silver Cup.

To Messrs. S. McGredy, Portadown, for Roses.

To Mr. C. Gregory, Chilwell, for Roses. To Messrs. Black & Flory, Slough, for Orchids.

To Messrs. Stuart Low, Jarvis Brook, for Orchids. To Messrs. Hillier, Winchester, for mixed group of trees, shrubs and aquatic plants.

To Mr. Amos Perry, Enfield, for mixed group of aquatic and herbaceous plants and ferns.

To Messrs. J. Waterer, Sons & Crisp, Bagshot, for trees and shrubs.

To Messrs. Bees, Chester, for mixed group of herbaceous plants, Dahlias and Chrysanthemums.

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IXXXII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To Messrs. Carter, Raynes Park, for greenhouse plants.

To Messrs. Dobbie, Edinburgh, for Dahlias.

To Messrs. K. Luxford, Sawbridgeworth, for Chrysanthemums.

To Mr. Stuart Ogg, Swanley, for Dahlias. To Mr. J. Macdonald, Harpenden, for grass garden.

Silver-gilt Flora Medal.

To Messrs. Sanders, St. Albans, for Orchids. To Messrs. Chaplin, Waltham Cross, for Roses. To Messrs. G. Prince, Longworth, for Roses.

To Messrs. R. Wallace, Tunbridge Wells, for mixed group of shrubs, Lilies and other bulbous plants.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. J. B. Riding, Chingford, for Dahlias.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for mixed group of herbaceous plants, Dablias and Chrysanthemums.

To Mr. W. Wells, jun., Merstham, for mixed group of herbaceous and rockgarden plants.

Silver-gilt Banksian Medal.

To Sir Jeremiah Colman, Bt., Reigate (gr. Mr. B. F. Perfect), for Orchids. To Messrs. R. Harkness, Hitchin, for Roscs.

To Messrs. Wm. Lowe, Beeston, for Roses. To Messrs. J. Waterer, Sons & Crisp, Twyford, for Roses.

To Messrs. Ben. R. Cant, Colchester, for Roses.

To Messrs. Dowty's Rosery, Wokingham, for Roses.

To Mr. E. Ladhams, Godalming, for mixed group of shrubs and herbaceous

and bulbous plants.

To Mr. W. J. Marchant, Wimborne, for trees and shrubs.

To Messrs. Maxwell & Beale, Broadstone, for Heaths.

To Mr. J. W. Forsyth, Luton, for Chrysanthemums. To Mr. T. M. Endean, Laindon, for Cacti and Succulents.

To Messrs. Neale, Newhaven, for Cacti and Succulents. To Messrs. Wm. Treseder, Cardiff, for Dahlias. Silver-gilt Hogg Medal.

To Messrs. G. Bunyard, Maidstone, for fruit.

To Messrs. Laxton, Bedford, for fruit.

To Messrs. T. Rivers, Sawbridgeworth, for fruit. To Messrs. J. Waterer, Sons & Crisp, Twyford, for Apples and Pears.

Silver-gilt Knightian Medal. To Messrs. Dickson & Robinson, Manchester, for Onions.

Silver Flora Medal.

To Messrs. D. Prior, Colchester, for Roses.

To Messrs. A. Charlton, Rotherfield, for trees and shrubs.

To Messrs. A. Chariton, Rotherheid, for trees and shrubs.
To Messrs. J. Cheal, Crawley, for trees and shrubs.
To The Donard Nursery Co., Newcastle, Co. Down, for shrubs.
To Mr. R. C. Notcutt, Woodbridge, for shrubs.
To Messrs. G. Reuthe, Keston, for shrubs.
To Messrs. R. Veitch, Exeter, for shrubs.

To Messrs. Allwood, Haywards Heath, for mixed group of Perpetual Border

To Mr. E. Ballard, Malvern, for Michaelmas Daisies.

To Messrs. Barr, Covent Garden, for Michaelmas Daisies, Montbretias and bulbous plants.

To Mr. T. Bones, Cheshunt, for Michaelmas Daisies.

To Messrs. C. Engelmann, Saffron Walden, for Carnations. To Messrs. M. Prichard, Christchurch, for herbaceous plants.

To Messrs. Wm. Wood, Taplow, for herbaceous plants and Dahlias. To Messrs. R. H. Bath, Wisbech, for mixed group of Gladioli, Dahlias and Michaelmas Daisies.

To Messrs. Carter Page, London Wall, for Dahlias.

To Messrs. J. Cheal, Crawley, for Dahlias.

To Mr. H. Hemsley, Crawley, for Dahlias. To Messrs. Hewitt, Solihull, for herbaceous plants.

To Messrs. Jarman, Chard, for Dahlias. To Messrs. Stuart Low, Bush Hill Park, for Carnations.

To Mr. A. Miles, Bickley, for herbaceous plants.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.
To Mr. J. T. West, Brentwood, for Dahlias.
To Mr. W. Yandell, Maidenhead, for mixed group of Chrysanthemums and Violas.

Silver Banksian Medal.

To Mr. H. Drew, Longworth, for Roses.

To Messrs. A. Reeves, Norwich, for Roses.

To Mr. E. J. Hicks, Hurst, Reading, for Roses.

To Messrs. F. Cant, Colchester, for Roses. To Messrs. Mansell & Hatcher, Rawdon, for Orchids.

To The Knap Hill Nursery, Woking, for shrubs.

To Messrs. J. Peed, West Norwood, for greenhouse and stove plants.

To Messrs. D. Stewart, Wimborne, for shrubs.

To Messrs. Bakers, Codsall, for mixed group of herbaceous plants and shrubs. To Messrs. Gavin Jones, Letchworth, for herbaceous plants.

To Messrs. C. Engelmann, Saffron Walden, for Gerbera hybrids and Cacti. To Mr. W. E. Th. Ingwersen, East Grinstead, for rock-garden plants.

To Messrs. M. Prichard, Christchurch, for rock-garden plants.

To Messrs. Daniels, Norwich, for Chrysanthemums.

To Messrs. J. Forbes, Hawick, for mixed group of Phloxes, Pentstemons, Michaelmas Daisies and Dahlias.

To The Gayborder Nurseries, Melbourne, for Michaelmas Daisies and other herbaceous plants.

To Mr. S. J. Goodliffe, Bishop Stortford, for Dahlias and Michaelmas Daisies.

To The Highfield Nursery Co., Enfield, for Violas and Chrysanthemums. To Messrs. B. Ladhams, Southampton, for herbaceous plants and shrubs. To Messrs. H. C. Lawrence, Chatham, for Chrysanthemums.

To Messrs. Redgrove & Patrick, Sevenoaks, for mixed group of Dahlias, Michaelmas Daisies and other herbaceous plants.

To The Suffolk Seed Stores, Woodbridge, for mixed group of herbaceous plants. To Mr. H. Woolman, Birmingham, for Begonias.

Silver Hogg Medal.

To The Barnham Nurseries, Barnham Junction, for Apples and Pears.

To Studley College, Warwick, for fruit.

Silver Knightian Medal.

To Messrs. S. Bide, Farnham, for Tomatos.

Silver Lindley Medal.

To Messrs. L. R. Russell, Richmond, for a group of Dracaena Victoria. Flora Medal.

To Mr. J. Mattock, Headington, for Roses.
To The Madresfield Gardens, Malvern, for Roses.
To Messrs. G. Bunyard, Maidstone, for shrubs and herbaceous plants.

To Mr. H. Hemsley, Crawley, for shrubs.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for trees and shrubs.

To Mr. W. A. Constable, Tunbridge Wells, for Lilies. To Messrs. Clarence Elliott, Stevenage, for rock-garden plants.

To The En-Tout-Cas Co., nr. Leicester, for Conifers.

To Mr. H. G. Longford, Abingdon, for rock-garden plants.
To Messrs. S. Smith, Bush Hill Park, for Cacti and Succulents.
To Messrs. J. Waterer, Sons & Crisp, Twyford, for rock-garden plants.
To Mr. G. E. Welch, Cambridge, for rock-garden plants.

To Mr. C. Turner, Slough, for Dahlias. To Messrs. Wakeley, London, for mixed group of Gladioli and Dahlias. Banksian Medal.

To Messrs. Allan, Norwich, for Roses. To Messrs. Wheatcroft, Gedling, for Roses.

To Messrs. Chalcraft, Dorking, for trees and shrubs.

To Messrs. Hollamby's Nurseries, Groombridge, for shrubs.

To The Ottershaw Nurseries, Chertsey, for shrubs.
To Messrs. Casburn, Bedford & Page, Trumpington, for rock-garden plants.
To Messrs. Clark, Dover, for rock-garden plants.

To The Dorset Nurseries, Blandford, for rock-garden plants.

To F. J. Hanbury, Esq., East Grinstead (gr. Mr. E. C. Taylor), for shrubs. To Mr. A. Hansen, New Barnet, for Sempervivums.

To The Hocker Edge Gardens, Cranbrook, for bulbous and rock-garden plants.

To Messrs. Gavin Jones, Letchworth, for rock-garden plants.

To Messrs. Stuart Low, Bush Hill Park, for greenhouse plants and shrubs.

To Messrs. Maxwell & Beale, Broadstone, for rock-garden plants. To Messrs. Oliver & Hunter, Moniaive, for mixed group of Heaths, bulbous

and herbaceous plants.

To Mr. G. P. Porter, Wimborne, for rock-garden plants.

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To Messrs. G. Reuthe, Keston, for Colchicums, Dwarf Asters, and other rock-garden plants.

To Messrs. J. Robinson, New Eltham, for rock-garden and herbaceous plants. To Messrs. W. H. Rogers, Southampton, for rock-garden plants.

To Messrs. J. Scott, Merriott, for shrubs.
To Mr. T. Carlile, Twyford, for Michaelmas Daisies and other herbaceous

To Messrs. Clark, Dover, for mixed group of herbaceous plants and shrubs.

To Messrs. E. F. Fairbairn, Carlisle, for mixed group of Phloxes and Dahlias. To Messrs. G. Gibson, Leeming Bar, for herbaceous plants and Conifers.

To The Godalming Nurseries, Godalming, for Dahlias. To Messrs. Hewitt, Solihull, for Dahlias.

To Messrs. I. House, Bristol, for Kniphofias, Scabious and Gaillardias.

To Messrs. G. F. Letts, Hadleigh, for Roses, Salvias, Dahlias and herbaceous plants.

To Mr. F. Rich, Worcester, for herbaceous plants.

To Messrs. W. H. Simpson, Birmingham, for Michaelmas Daisies and other herbaceous plants.

Knightian Medal.

To The Committee of the Lichfield (Staffs.) & District Allotments, Gardens and Smallholding Society, for vegetables.

To The Allotments Committee for the Forest of Dean Area, for vegetables. To The Shildon (Durham) Urban District Council Allotments Committee, for vegetables.

Lindley Medal.

To Messrs. Bowell & Skarratt, Cheltenham, for aromatic plants.

OCTOBER 5-6, 1933.

FRUIT AND VEGETABLE SHOW.

Chief Awards in the Competitive Classes.

FRUIT.

The Gordon-Lennox Cup, for the most meritorious display of fruit staged by an amateur.

To Sir Randolf Baker, Bt., Blandford, Dorset (gr. Mr. A. E. Usher).

The George Monro Memorial Cup, for the best exhibit of Grapes staged by an

To Lady Savile, Rufford Abbey, Ollerton (gr. Mr. J. Doe).

The Affiliated Societies Challenge Cup, for the best exhibit of fruit staged by an Affiliated Society.

To The Marlpit Hill Gardening Society, Edenbridge, Kent.

Class 1.—Collection of nine dishes of ripe dessert fruit.

First Prize, Silver Hogg Medal and £9.

To Lord Swaythling, Southampton (gr. Mr. F. J. Rose).

Class 2.—Collection of six dishes of ripe dessert fruit.

First Prize, Silver Hogg Medal and 45.

To C. G. A. Nix, Esq., V.M.H., Tilgate, Crawley (gr. Mr. E. Neal).

Class 3.—Collection of eight bunches of Grapes.

First Prize, Silver Hogg Medal and £12.

To Lady Savile, Rufford Abbey, Ollerton (gr. Mr. J. Doe).

Class 4.—Collection of four bunches of Grapes.

First Prize, Silver Hogg Medal and £5.

To Lord Swaythling, Southampton (gr. Mr. F. J. Rose).

Class 17.—Collection of twenty-four dishes of hardy fruits.

First Prize, Silver Hogg Medal and £12. To Sir Randolf Baker, Bt., Blandford (gr. Mr. A. E. Usher).

Class 18.—Collection of twelve dessert varieties of Apples.

First Prize, Fruiterers Company's Silver-gill Medal and £5.

To C. G. A. Nix, Esq., V.M.H., Tilgate, Crawley (gr. Mr. E. Neal).

Class 19.—Collection of twelve culinary varieties of Apples. First Prize, Fruiterers Company's Silver Medal and £5.

To C. G. A. Nix, Esq., V M.H., Tilgate, Crawley (gr. Mr. E. Neal).

Class 23.—Collection of twelve dessert varieties of Pears.

First Prize, Silver-gilt Hogg Medal and 55.

To Lt.-Colonel F. J. B. Wingfield-Digby, Sherborne Castle, Dorset (gr. Mr. E. Hill).

Class 79.—Market Growers. Four British standard half-boxes of 'Cox's Orange Pippin 'Apple.

First Prize, Silver Hogg Medal and £4.

To Mr. W. H. Maelor Jones, West Horsley.

Class 80 .- Market Growers. Four British standard half-boxes of any dessert variety of Apple other than 'Cox's.'

First Prize, Silver Hogg Medal and £4. To The Hollesley Bay Labour Colony, Suffolk.

Class 81.—Four British standard boxes of 'Bramley's Seedling' Apple.

First Prize, Silver Hogg Medal and £4. To The Hollesley Bay Labour Colony, Suffolk.

Class 82.-Market Growers. Four British standard boxes of any culinary Apple other than 'Bramley's Seedling."

First Prize, Silver Hogg Medal and £4.

To The Hollesley Bay Labour Colony, Suffolk.

Class 83.-Market Growers. Three one-layer boxes of 'Cox's Orange Pippin' Apple.

First Prize, Hogg Medal and £2.

To Mr. W. H. Maelor Jones, West Horsley.

Class 84.—Three one-layer boxes of any dessert Apple other than 'Cox's Orange Pippin.'

First Prize, Hogg Medal and £2.

To The Reading University, Reading.

Class 85.—Market Growers. Three one-layer boxes of 'Conference' Pears. First Prize, Hogg Medal and £2.

To The Hollesley Bay Labour Colony, Suffolk.

Class 86.-Market Growers. Three one-layer boxes of 'Doyenné du Comice' Pears.

First Prize, Hogg Medal and £2. To Mr. T. Neame, Faversham.

VEGETABLES.

The R.H.S. Vegetable Challenge Cup, for the highest aggregate number of points in the Vegetable Classes.

To Sir Randolf Baker, Bt., Blandford (gr. Mr. A. E. Usher).

The Riddell Cup, for a table of vegetables.

To Sir Randolf Baker, Bt., Blandford (gr. Mr. A. E. Usher).

The Sutton Cup, for a collection of twelve kinds of vegetables.

To H. R. Beeton, Esq., Checkenden, Kent (gr. Mr. J. Wynn).

A lecture was given by Mr. E. A. Bunyard, F.L.S., on "Figs" (see p. 61). Chairman, Mr. C. G. A. Nix, V.M.H.

OCTOBER 24-25, 1933.

ORCHID SHOW.

COMPETITIVE AWARDS.

The Schröder Challenge Cup, for the best exhibit of Orchids staged by an amateur.

To F. J. Hanbury, Esq., F.L.S., V.M.H., Brockhurst, East Grinstead (Orchid grower, Mr. S. Farnes).

Trophy, for the best exhibit of twelve Orchids staged by an amateur. To C. G. Osborne, Esq., Highfields, Marlow (gr. Mr. J. E. Jones).

A lecture was given by Mr. H. R. Darlington, F.L.S., on "New Roses" (see p. 50).

Chairman, Mr. W. R. Oldham.

XXXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

NOVEMBER 7, 1933.

Silver-gilt Grenfell Medal.

To Mrs. D. R. Tweedie, Kenya, for water-colour drawings of East African Orchids and other flowers.

Silver Grenfell Medal.

To Mrs. N. Stone, Cranleigh, for flower paintings.

To Miss W. Walker, Hampstead, for flower paintings.

To Mrs. A. C. Reeve Fowkes, Eastbourne, for flower paintings.

NOVEMBER 28, 1933.

Silver-gilt Grenfell Medal.

To Mr. F. Galsworthy, Chertsey, for flower paintings.

To Miss M. I. Greenfield, Lindfield, for flower paintings.

Silver Grenfell Medal.

To Miss M. E. Oddie, Uckfield, for flower paintings.

To Miss E. Savory, Chertsey, for flower paintings.

Grenfell Medal.

To Miss C. E. Peters, Barnstaple, for flower paintings.

To Mr. A. G. Stubbs, Hove, for flower paintings. To Mrs. Sterndale Bennett, Wateringbury, for flower paintings.

A lecture was given by Mr. Laurence J. Cook on "Carnations." Chairman, Mr. George Monro, C.B.E.

DECEMBER 12, 1933.

Silver-gilt Grenfell Medal.

To Mrs. E. G. Simpson, Speldhurst, for flower paintings.

To Mrs. V. Higgins, East Croydon, for paintings of Orchids and Succulents.

Silver Grenfell Medal. To Miss D. Ratman, Quex Road, London, for flower paintings.

To Lady Beatrix Stanley, Madras, for Lily paintings.

Grenfell Medal.

To Mrs. N. Stone, Cranleigh, for flower paintings.

To Miss G. Thomasett, Lee, for flower paintings.

JANUARY 9, 1934.

Grenfell Medal.

To Miss J. N. Williams, Chelsea, for drawings of seed vessels.

JANUARY 23, 1934.

Grenfell Medal.

To Miss I. M. Charters, Leicester, for floral paintings.

To Mrs. Henny Spencer, Balham, for paintings of wild flowers of the Alps. To Mrs. Gordon Duff, Hatton Castle, Sherriff, for flower paintings.

A lecture was given by Dr. M. A. H. Tincker, M.A., F.L.S., on "Popular Weed-killers."

Chairman, Mr. W. B. Cranfield, F.L.S.

FEBRUARY 6, 1934.

Silver Grenfell Medal.

To Miss F. L. Bunyard, Rye, for paintings of fruit.

A lecture was given by Mr. W. M. Ware, M.Sc., on "Mushrooms" (see p. 230). Chairman, Mr. E. Beckett, V.M.H.

FEBRUARY 20, 1934.

Silver Grenfell Medal.

To Miss E. Savory, Chertsey, for paintings of Cinerarias. To Miss D. Ratman, 46, Belgrave Road, S.W., for flower paintings. To Mrs. N. Stone, Cranleigh, for flower paintings.

Grenfell Medal.

To Mr. W. Abbing, 92, Cotswold Gardens, N.W. 2, for coloured photographs of flowers and gardens.

To Mr. A. G. Stubbs, Hove, for drawings of wild flowers.

REPORT of the ONE HUNDRED AND THIRTIETH ANNUAL MEETING, held on Tuesday, February 20, 1934, in the Lecture Room, New Hall, Greycoat Street, Westminster.

The Lord Aberconway, C.B.E. (President) in the Chair, supported by Members of Council and about two hundred and forty Fellows.

The SECRETARY read the notice convening the Meeting.

The SECRETARY announced that the Minutes of the last Meeting, held on February 21, 1933, had been circulated in Vol. 58, Part 2, of the JOURNAL.

The CHAIRMAN then moved that the Minutes be taken as read, and that they be adopted.

The motion was agreed and the Minutes were signed by the Chairman.

The PRESIDENT: I now rise to move that the Report of the Council for the

year 1933 be and is hereby adopted.

The Report is a long one because the Council feel it their duty to disclose to the Fellows their activities during the year; and they put them forward to give the Fellows an opportunity of praising them or blaming them, and I hope that we see you meeting here this afternoon in a genial mood. But whatever sins of omission or of commission may be attributed to the Council, your Council have at any rate done their best, and a very strenuous best, for the benefit of the Society. There is no doubt that during the year there have been manifest signs of prosperity in the Society. Take the Fellowship: on November 7, 1933, the net increase in that year up to that date had been 1,400 Fellows. I have asked why do we take the date November 7. I have heard of the date November 5 (laughter), but November 7 is a somewhat mysterious date. I cannot receive any very intelligible answer from the Secretary, and it remains a matter between him and his conscience (laughter). But, however that may be, that increase compares with a loss of 414 between the same dates in 1931 and a loss of 693 between the same dates in 1932. That makes a net gain, as those of our Fellows who are arithmeticians will be able to calculate, of 293. But actually the net gain from the previous highest total is 371.

Now that is not a matter between the Secretary and his conscience; it is a matter between the Secretary and his card index. He has not had to take his conscience to task, but he has re-counted his card index and added a gain of 78

Fellows to our Roll.

But that is not all. Since that mysterious date, November 7, we have had another 1,414 Fellows elected. We have to set off from that deaths and resignations; and that leaves a net addition of 707 and brings our total Fellowship to 29,104 at this date, a stupendous figure for any horticultural society.

29, ro4 at this date, a stupendous figure for any horticultural society.

I will now deal with the principal activities of the Society, which divide themselves practically into three: our Shows; our Wisley Garden; and our

Publications.

The past year has been dealt with so fully in the Report that I will not add to what has been said there. I would only say that if any Fellow desires to ask me any questions about the doings of the past year I shall be only too happy to answer them to the best of my ability. I will deal, therefore, this afternoon with events to come.

In regard to our Shows the premier one, of course, is Chelsea, and there we propose to make no material change in the arrangements. I can prophesy that it again will be crowded. But, after all, a crowd is not a bad thing if it is the right kind of a crowd, and there is no better kind of a crowd, I should venture to suggest to you, than a crowd of gardeners. To those of our Fellows who think they may have too much of a good thing I would suggest that experience has proved that in the earlier hours of the day, and still more in the later hours of the day, there is plenty of room at Chelsea. I think, now that our arrangements are stabilized, so to speak, our Fellows will find that out, and the attendance will, perhaps, be more regularly distributed throughout the day.

In regard to the Autumn Show we are, as you know, again holding it under one roof and at one time. I have always advocated, both at your General Meetings and at the meetings of the Council, the policy of having one large Autumn Show. It has been very difficult in the past, because of the difficulty of getting a hall large enough for all the exhibitors who wish to exhibit and all the Fellows who wish to attend. But it must be remembered that many of our

Fellows live at a great distance from London. Those who live near London can easily attend our Fortnightly Shows and see the flowers from fortnight to fortnight as they are in season. But Fellows who live at a distance from London and professional gardeners find it more difficult to get up every fortnight, and they value very much the opportunity of coming to London in the autumn to see the shrubs and the flowers and the fruit, all as far as possible at one Show. Not only do they see a larger and finer collection of plants, but it also gives them an

opportunity of meeting more of their old friends.

Last year we had a most successful revival of the Autumn Show held in a Hall at Olympia, and we should have been very glad to have repeated that in 1934, but, unfortunately, there is an old-standing engagement for that Hall which takes it every alternate year, and neither that Hall nor any other accommodation at Olympia was available for 1934. In those circumstances we have arranged to hold the Show at the Crystal Palace. It is a most admirable building for a Flower Show. It was built by a gardener, Sir Joseph Paxton, as you will remember. The only difficulty about it was that after it was built someone moved it away from Hyde Park, where it was admirably placed for a Flower Show, and set it down at Sydenham. But Sydenham is not so very inaccessible; it is well served by trains and by omnibuses, and many of our members who live south of London will find it a very convenient place to get to in their cars. We will take care that before the date full information will be given to our Fellows and to the public, as to the best methods of reaching the Show ground.

We have also decided to add to the interest of our Autumn Show by arranging for the Fruit Show and Conference to be held at the same date and place, and I believe—though that is not of our arranging—that on one night there will be

fireworks, even though it be not November 5.

Then I should like to say a word or two about the Society's Garden at Wisley. Our fruit trials are continuing even although the Government grant has been greatly reduced by reason of the policy of economy which is being pursued by Government Departments. Those fruit trials do very great service to those who grow fruit, and especially to market gardeners and professional fruit-growers, because not only do the trials show what are good fruit trees to plant, but they do a very good work in turning down new types of fruit trees which, for one reason or another, are not a success. Although the Government grant is reduced, the Government Department is asking certain branches of the horticultural trades to make up some of that deficiency.

In the Laboratory at Wisley our scientific work under Dr. Tincker is being turned rather more, as I foreshadowed at the last meeting, towards research problems which are of interest to gardeners. We have to advise the Council a Committee of eminent scientific men in the botanical world: Sir Daniel Hall, Sir Arthur Hill, Professor Blackman, Dr. Weiss, who is President of the Linnean Society, and our old friend, Dr. Rendle, all of whom give us invaluable advice

as to what are likely to be the best branches of research.

In the Garden itself at Wisley we are trying the rather difficult task of combining improvements with economy. Mr. Harrow, our Director, and Mr. Musgrave, the Chairman of the Council Committee which directs the details of the work at Wisley, have devoted much attention to these two subjects. The economy is not, perhaps, as marked as our Treasurer would wish, although the expenditure this year is less than it was last year, but the economy is there notwithstanding. It is somewhat disguised by three factors: by the fact that we are now giving a maintenance allowance to our student gardeners, as is done at Kew and Edinburgh, thereby securing a class of men who wish to make horticulture their life's work; by the fact that we have had certain special expenditure on a new car and a new lorry and on heavy repairs to our access road; and by the fact that our receipts are down owing to the diminution of the Government grant for our fruit trials and to the loss of nearly all the fruit crop through an untimely spring frost. Next year we hope that the economies will be more evident. Meanwhile, I think those of you who honour the Gardens with a visit this summer will find that the improvements are more manifest.

Half of one of the large glasshouses is being devoted to an indoor rockwork on the same model that has proved so successful at the Royal Botanic Gardens in Edinburgh, where we shall hope to grow some of the smaller plants of interest

which are not happy out of doors in the Wisley climate.

Then we are constructing a large double herbaceous border on the ground where the paeonies used to be between the Laboratory and the River Wey. The paeonies were worn out, and the present herbaceous borders are unsuitable, because two of them were up in a very dry and windy situation and the other was ill-constructed and too wet. These herbaceous borders I do not put forward as one of the economies we are making, but the Council felt that the expenditure on

them was excusable, because so many of our Fellows devote so much of their gardening time to herbaceous borders. We felt that if we had herbaceous borders growing all the best plants that could be grown in them and planted with the skill which Mr. Harrow so well showed in the great herbaceous border at the Edinburgh Botanic Gardens, that would be a thing which our Fellows would welcome at Wisley, and which might be of some help to them in their own gardens.

We are also planting—this will not be so evident for the moment—a piece of ground for autumn colours. Those of you who know the great autumn colour planting at Westonbirt done by the late Sir George Holford, or at Sheffield Park, in Sussex, will know that at a time of year when the herbaceous border is looking rather sad, and the rock garden looking rather draggled, the wild part of the garden is lit up with what I can fairly describe as a blaze of glory. It is a most wonderful thing, the planting for autumn colour, and it is not only a wonderful thing to see, but it also is not a costly thing to maintain, because it means merely the planting of shrubs and trees which do not require a great deal of cultivation in future years. But it is a slow process. We are making a beginning in the field along the Wey, between Seven-acres and that right of way which runs across our ground. That is the field in which conifers were planted, but the conifers have not done very well. It is a dry, sandy field, which has been reported on by Mr. Harrow as being very suitable for such a planting of autumn colouring shrubs, and we are making a beginning there this year. It will, of course, be many years before we get a great effect, because the shrubs are planted small and will take some time to grow. But Lord Morley, who owns Westonbirt, has been good enough to give us a large number of well-grown plants raised from some of his best autumn colouring maples, for which we are very grateful to him, and with these and other plants we are making, at any rate, a start.

Lastly, I think you will recognize that there has been, and there is continuing, a general improvement in the cultivation throughout the Wisley Gardens. That

is due to the experience and care of our Director, Mr. Harrow.

The last thing I have to say to you about Wisley is this: the Council, after very careful consideration, have decided that it would be advisable to open the Wisley Gardens, on weekdays only, to the general public on payment by them of a small admission fee. You know that the Zoological Society does the same with Whipsnade. We propose to allow members of the public who are not Fellows to go to Wisley Gardens on any weekday on payment of 2s. 6d. We have fixed the fee fairly high so that we should not get such crowds as may in any way incommode our Fellows, and the gardens will be reserved entirely for our Fellows on Sundays. Of course, the ordinary conditions as to admission by Fellows' tickets will obtain in the future as in the past, that is to say, every Fellow's ticket will admit three persons free of charge.

That I think is all I have to say to you about Wisley. I should like now to

deal for a few moments with the question of our publications.

Firstly, there is the Botanical Magazine. We grieve very much over the death of the late Editor, our old friend, Dr. Stapf, who was one of the leading botanists of his generation, and considered the Botanical Magazine as one of the principal objects of his life. He will be greatly missed. But we are fortunate in having been able to secure the help of Sir Arthur Hill, the Director of Kew, who has consented to become the Editor of the Magazine, and we are quite sure that it will not suffer under his able direction.

Our JOURNAL has now been published for 125 years. For the first thirty years of its publication it was called the "Transactions of the Society" and there is an admirable index of those thirty years. But for the remaining years up to the present time there is no general index at all. Now our JOURNAL is a storehouse of knowledge that has been collected at the cost of much energy, of much talent and of much money, and it is very largely inaccessible through the want of an index. It is quite true you can sit down, take up volume after volume and read very interesting matter, but if you want to find out what has been said about Lilies or about Rhododendrons, or when this or that plant was introduced or first shown to the Society, there is no ready way of obtaining that information. Now we have an index in card form which is up to date and only requires a small amount of revision for publication. The Council have decided to publish the index to the last hundred years of our Journal. That index I think you will find to be a key which will unlock a treasure-house of horticultural information. It will serve a second purpose. Mr. Chittenden has ingeniously suggested that this index can be made also to serve the purpose of a record of the Awards of Merit and First-class Certificates given by the Society. You know that we have a list of those published up to the year 1910—I think it is now out of print-and we have published successive supplements every few

years. If you want to find out whether a plant has had an award you must look through the original list and every supplement. Now it is proposed in the index to print the names of those plants which have had an award and to put after them the date of the award and the name of the exhibitor. That has the added advantage that you will be referred to the exact volume of the JOURNAL which you can consult at home or in the Lindley Library, and you will find out what was said about the plant on the date when it received the Award of Merit. index is a bulky matter and it will be a fairly costly thing to publish. We think the net cost, after allowing for the probable sales, will be about £1,000; we propose to set aside half of the amount this year and half of it next year, for it will be next year by the time the index is published.

We also propose another somewhat drastic change in the form of the Journal We have for some time been considering whether our periodical publication could not be made to give information that was more up to date, and whether also by means of this publication we could not keep more closely in touch with Fellows who live at a long distance from London. The Council, after very careful consideration which has lasted for a considerable time, have come to the conclusion that it would be desirable to publish the JOURNAL each year in twelve parts, one a month. The size of the JOURNAL, each part, will be something like this (exhibiting small magazine) and we should have some rather more attractive cover on it. The details of that are yet subject to discussion. We should not alter the matter materially, except that all the reports of meetings and proceedings of the Society would of course be given you more promptly instead of coming some months after the date. Subject to the consideration of the details-I must not be taken as putting the thing before you too precisely because we have to look into various aspects of it—it is proposed that the first monthly part shall be published this September.

That is all I have to say to you, Ladies and Gentlemen, as to the activities

of the Council. I would like now briefly to refer to the Council itself.

First, may I express the feeling of irreparable loss that we have at the sudden and untimely death of Sir William Lawrence. He was a very great gardener; he knew a vast range of plants; he was a man of unbounded energy; he had a most fertile brain and we shall miss him greatly both as a friend and as a colleague. I am sure that the sympathy of you all goes out to his widow and to his family in their bereavement.

When a vacancy of this kind occurs on the Council the members of it have under your Charter the right and duty of filling the vacancy for the unexpired term of the deceased member's election. Acting on that power they have appointed Mr. David Bowes-Lyon to fill the vacant place. He is of a younger generation than the other members of the Council, but I am sure you will not consider that a disqualification, and at any rate that disadvantage, if it be a disadvantage, is one that he will live down. He is so keen a gardener that he

spent many months as a student gardener working at Kew.

Then we lose in the natural course of events the three members of Council who retire at this meeting. We lose Sir Arthur Hill, the Director of Kew, whose knowledge of matters of administration and of science has been of the greatest help to us; we lose Mr. Bunyard, our expert on fruit and vegetables and on books, a most unbiased and reliable adviser also on the commercial side of horticulture; we lose Mr. Stern, who combines great enthusiasm-he is sufficiently enthusiastic to grow Rhododendrons in a chalk pit—with a very sound knowledge of what is practical and what is not—his Rhododendrons succeed in his chalk pit. We lose these three Members of Council to our great regret, but we hope that the loss may be only a temporary one and that they will rejoin us in the future. On the other hand, we gain our old friend Mr. Bowles, who has an uncanny knowledge of plants and how to paint them; we have Mr. Stevenson, who is a great expert on publications and on building, two subjects with which the Council are much concerned, and he has a very sound business judgment on which we can always rely. Mr. Noel Sutton, who is the third new Member of Council, is a partner in the great firm that has enriched so many gardens with good seeds and good strains. We are very fortunate in being able to choose from among so many able men who are willing to serve us in the very onerous capacity of Members of Council.

In conclusion, I would like to express, and this I do not only on behalf of the

Council but I am sure on behalf of all our Fellows, our thanks: firstly, to our Staff; our Secretary, in whom we have the utmost confidence and whose whole heart is in our work; Mr. Chittenden, our Editor, who makes our Fellows wise on difficult points which they meet with in gardening; Mr. Harrow, the most skilled of cultivators and the pleasantest of personalities, as those of you who go and meet him at Wisley will recognize; Mr. Simmonds, who arranges our Shows so skilfully, and all those who work with them and under them. The

thanks of our Fellows go to our Staff.

Then we owe thanks to our Committeemen and our Judges; they are busy men who give much time to the work of the Society, and while their impartiality of course goes without question they show great discretion and great judgment in the bestowing of awards. Our thanks must go also to them.

Then there is the Press which gives us kindly support in all our efforts. is quite true that we have not the news interest of our friends the Zoological Society. A seedling Begonia or a seedling Rhododendron has not the same news interest in the Daily Press as a baby marmoset, but at the same time they are very good to us. We must not forget that we have an extremely well-conducted Gardening Press devoted to our special subject which has a heavy circulation and which is always most good in giving us the space that we deserve.

Then again, we owe many thanks to our exhibitors, both amateur and pro-The displays at our Shows, especially at Chelsea and the Autumn Show, are unequalled I believe at any shows in any quarter of the world. very glad to think that, as far as our professional exhibitors are concerned, they seem to have got through the time of depression, and from all reports have

weathered the storm and are doing well again.

Lastly, I must convey the thanks of the Council and the Staff and myself to our Fellows for their confidence in us, for the way in which they support us, and for their quite remarkable power of increasing their numbers.

I will ask the Treasurer, Mr. Trotter, to second the Resolution which I have

moved and to make a statement as to the finances of the Society.

Mr. R. D. TROTTER: Mr. President, Ladies and Gentlemen,—I have much pleasure in seconding the proposal for the adoption of the Report which the President has put before you, and will add a few words on the subject of the Accounts.

I do not propose to go into the minor details of the accounts to-day, but rather to point out to you the main changes as compared with the previous year and to give you a short explanation of those changes. I have all the full details and analyses of the Accounts if any Fellow wants to see them.

May I start with the Revenue and Expenditure Account on p. 18 of the

Book of Arrangements.

Establishment Expenses. The reduction in salaries and wages is due to allocations to the Autumn Show Account and the Lindley Library Account. The increase in other establishment expenses is for printing and postages due to this increase in Fellowship which the President has told you about.

The Journal and Other Publications. There again the Journal has cost more owing to the increase in circulation coupled with a larger number of pages and illustrations, some of them coloured. We have published Daffodil and Lily

Year Books and Lists of Awards made to Plants.

As regards Meetings, the Chelsea Show gives a much better result than the year before. Before charging Overhead Expenses, the deficit this year was

only £3 as compared with £702 in the previous year.

Now the Autumn Show: whereas in 1932 the accounts of the Autumn Shows were included in the figures of "Special and Other Meetings," we have new figures this year showing the result of the Autumn Show which was held at Olympia. It will be seen that after charging f_{250} for Overhead Expenses, the deficit was f_{676} . This can be considered satisfactory taking into account the heavy expenses of running such a Show and that the Show from all other points of view was, I think, a distinct success.

The Library, of course, shows an increase due to the change in Librarians. Special Expenditure. This is given in detail, and it may be sufficient if

I say the amount is £300 less than a year ago.

Depreciation and Renewals you will not find in this year's Account, for in 1932 the Accounts included a charge of £2,255 which was necessary to bring the Fund up to the total of fro,000, the amount decided by the Council to be sufficient for such purposes, that is to say, for Furniture and Appliances. Until such time as it is necessary to draw on this amount, no further reserves will be made to depreciation.

Turning to the Receipts side. Subscriptions: As a result of the increase in Fellowship in our accounting year to 28,400—the President tells us it is the highest total in our history—the subscriptions show an increase of £1,200. Most of that increase is in One Guinea subscriptions, and we hope many of those

may be converted later on into Two and Four Guinea members.

As regards Hall Lettings, this shows a decrease due to the Halls being let on fewer occasions.

Now there is a big change in the figures of the Vincent Square Balance Sheet; we made a number of changes in the investments, a complete Schedule of which will be found on pp. 30-32 of the Book. We were able to make considerable profits over the cost prices at which the old stock stood in the Balance Sheet. The various funds received the benefit of these appreciations, but in such cases where it was desirable for the funds to remain at their original figures, as, for instance, the Weather Insurance Fund and the Depreciation Fund, the differences have been applied to the Fund, which will operate as a reserve against depreciation of investments; the total of this Fund at the moment is $f_1,680$.

The only other point in the Vincent Square Balance Sheet is the Overdraft, which is covered by the General Investments, where you will see we have invested

£7,400 during the year.

Turning to the Wisley Revenue and Expenditure Account, the expenditure at Wisley, excluding the special items which have been brought down into a separate account at the bottom of the page, has been reduced by $f_{1,523}$ due to various economies and the letting of the Farm. The receipts on the other side have necessarily dropped. There were no farm sales, and owing to the conversion of War Loan the dividends are less. These figures together show that the net expenditure on Wisley is £350 less than in 1932.
You will have observed that we have now returned to the stage where we

have a cash balance on the right side after having been on the wrong side for several years, due to the cost of this new Hall, but we should still like to see our

membership revenue continue to expand steadily.

May I close with a word of thanks to Mr. Feather, our Auditor, who is sitting beside me, and our own Accountants. The details of the balance sheets have been very fully analysed, which means a lot of work. The new allocation of stocks to our various Funds on the change of investments has entailed much work, very much more than appears on the surface, and this has been very ably

The CHAIRMAN: Before I actually move the motion, does any Fellow wish to put any question or make any remarks upon the Report?

Miss Helen Colt: I should like to ask a question in regard to the Government grant which I understand has been taken away from the fruit garden at Wisley, or reduced. Could the Government explain to us why it tells us to grow more fruit and at the same time reduces the grant to the Royal Horticultural Society? I have had occasion to see the important and efficient work done on fruit-growing at Wisley. How can this work, which is of the greatest value to growers, continue if that grant is reduced by the Government, which, I repeat, has been urging the British nation to grow more fruit?

The CHAIRMAN: I think that the Council quite sympathize with your view; it is a conundrum that they have not been able to solve. The only answer that we can get out of the Treasury is the plea of economy, and that plea, you know, covers a multitude of sins.

Mr. Ellis: Might I just add one word of appreciation in a direction to which reference has not been made. That may seem strange after the wonderful and comprehensive address you have given us to-day, for which we are all indebted to you. The reference is to the lectures. I would like just to say how much some of us appreciate the very practical turn that has been given to the lectures during recent months. If I may supplement that, I would like to ask that those who take an interest in the academical side of things shall not be altogether overlooked. Nevertheless, we do greatly appreciate the very practical course of lectures that has been submitted.

There is perhaps one other question—could we have any explanation as to what has happened in regard to the item on p. 26 of "41 per cent. Moscow Loan "?

The Chairman: In reply to Mr. Ellis's question, I am entirely at one with him about the lecturers. Perhaps I should have referred to them in my remarks. We have thanked them in our Annual Report, but there are so many who do good service for the Society that it is hardly possible to mention all of them in the compass of the brief time which I have at my disposal.

The City of Moscow Loan was a loan in which the Society invested a great many years ago, before the War, when Moscow was as reputable a town financially as any other town in the world. Now that loan is, of course, of no value and is

written off.

Mr. Ellis: Thank you very much.

The CHAIRMAN: If there is no other question, I will put the motion that has been proposed and seconded, namely, that the Report of the Council for the year 1933 be and is hereby approved.

(Motion put and carried unanimously.)

Mr. C. T. Musgrave: Ladies and Gentlemen,—There is only one nomination for the President for the coming year, so in accordance with Bye-Law 57 of the Society's Bye-Laws I hereby declare that Lord Aberconway is duly elected as President of the Society for the coming year.

The CHAIRMAN: Mr. Musgrave, Ladies and Gentlemen,-I can assure you I very deeply appreciate the honour which you do me in electing me as President of the greatest Horticultural Society in the world. I could say much more, but my predecessor, your President for 1933, has already this afternoon, to my great regret, taken up too much of your time and I will only, therefore, add that anything that I can do for the Society, and I fear it is but little, shall be done with all my power.

I beg to announce that the following elections have taken place of Vice-Presidents, Members of Council, Treasurer and Auditor, there being no other

nominations under Bye-Laws 57 and 61 :--

As Vice-Presidents:-

The Duke of Bedford.

The Duke of Portland. The Viscount Ullswater.

Sir James Knott, Bt.

The Rt. Hon. Sir Herbert Maxwell, Bt.

Lt.-Col. Sir David Prain.

Mr. E. A. Bowles. Mr. Wm. Cuthbertson. Mr. G. W. E. Loder. Mr. J. C. Williams.

As Members of the Council:-

Mr. E. A. Bowles.

Mr. J. B. Stevenson. Mr. Noel Sutton.

As Treasurer, Mr. R. D. Trotter.

As Auditor, Mr. J. S. Feather, of Messrs. Harper, Feather & Paterson.

I will now proceed to make the presentations.

The President then made the following presentations, the names of the recipients being announced by the Secretary.

VICTORIA MEDALS OF HONOUR.

Victoria Medal of Honour.-To Mr. G. P. Baker, for his work in the introduction and cultivation of new plants.

The CHAIRMAN: Mr. Baker, I have very great pleasure in giving you the Award of V.M.H. You have been most active in introducing new plants and in showing us how to grow them, and you have also been good enough to put your time and your experience very generously at the disposal of the Society.

Victoria Medal of Honour.—To Mr. J. Coutts, for his services to horti-

The CHAIRMAN: Mr. Coutts, as Curator of the Royal Gardens at Kew, you fill one of the most important positions in the world of Horticulture. You have done admirable work there, if I may venture to say so, and you have also been good enough to put your experience most liberally at the disposal of the Society. We made you an Associate of Honour last year, now we give you the higher Award.

Victoria Medal of Honour.—To Sir John Farmer, for his services to botanical and horticultural science.

The CHAIRMAN: Sir John Farmer, I understand, is not able to be here to-day. He has helped gardeners very much on the scientific side of their work with the admirable books that he has written.

Victoria Medal of Honour.—To Mr. George Shawyer, for his work in the advancement of commercial horticulture.

The CHAIRMAN: Mr. Shawyer, you, as Senior Partner of Messrs. Lowe & Shawyer, are one of the leading spirits in that great cut-flower trade which gives so much employment in England and which brightens so many homes in our large cities. I have great pleasure in handing you the Victoria Medal of Honour.

ASSOCIATESHIPS OF HONOUR.

The Associateship of Honour was then conferred on the following:

Mr. J. ALEXANDER, Head Gardener to Mrs. Wauchope, of Niddrie, Craigmillar, near Edinburgh.

Mr. Donald Allan, Manager of Messrs. Dobbie & Co.'s Seed Farms at Marks Tey, Essex.

Mr. Thomas Beatty, Foreman of Messis. Ben. R. Cant & Sons.

Mr. J. CHRISTY, Park Superintendent for the Metropolitan Borough of Camberwell.

Mr. W. B. Clark, Park Superintendent for the City of Aberdeen.

Mr. GEORGE J. E. INGRAM, Secretary of the Gardeners' Royal Benevolent Institution.

Mr. W. R. Mustoe, O.B.E., late Superintendent of the Agricultural and Horticultural Department, Delhi.

Mr. BERTRAM F. PERFECT, Orchid-grower to Sir Jeremiah Colman, Bt., at Gatton Park, Surrey.

Mr. Samuel Radley, Foreman of Messrs. Robert Veitch & Son, Ltd.

Mr. Samuel Smith, Head Gardener to Mr. H. B. Fox, at Penjerrick, Falmouth, Cornwall.

Mr. SYDNEY TUCKER, Head Gardener to the Earl of Radnor, at Longford Castle, Salisbury, Wilts.

The Lawrence Medal.—To Messrs. Seymour Cobley, Ltd., for their exhibit of British-grown bulbs on August 29.

The Holford Medal.—To Mr. F. J. Hanbury, for his exhibit of Orchids on October 25.

Veitch Memorial Medal in Gold .- To Mr. A. Grove, for the work he has done on Lilies.

Veitch Memorial Medal in Gold.—To Rt. Hon. Sir Herbert Maxwell, Bt., in recognition of his writings, paintings and other work for horticulture.

Veitch Memorial Medal in Silver and £25.—To Mr. W. J. Bean, for his supplementary volume on "Trees and Shrubs."

Veitch Memorial Medal in Silver and £25.—To Mr. A. Simmonds, for his

work in organizing the Lily Conference, as Secretary thereof. Veitch Memorial Medal in Silver .- To Mr. H. R. Hutchinson, for his 34 years' service as Librarian.

The Sander Medal.—To Messrs. Allwood Bros., for the Perpetual-flowering Carnation 'Robert Allwood,' shown at Chelsea on May 24–26, 1933.

The George Moore Medal.—To Lord Aberconway, for Cypripedium X F. C. Puddle,' Bodnant var., shown at the Great Autumn Meeting on

September 27-29, 1933.

Williams Memorial Medals.—To Messrs. H. G. Alexander, Ltd., for their exhibit of Cymbidiums staged on March 7, 1933; and to Messrs. R. Bolton & Son, for their exhibit of Sweet Peas staged at Chelsea on

May 24-26, 1933.

The Cory Cup.—To Mr. F. L. Skinner, for his Lilium × 'Maxwill,' shown on July 11, 1933.

The Loder Rhododendron Cup. To Mr. E. H. Wilding, in recognition of his contributions to Rhododendron literature.

That, ladies and gentlemen, concludes our presentations.

REPORT OF THE 130TH ANNUAL GENERAL MEETING. XCV

Mr. Hanbury: Before we disperse, I am sure you would all join with me in a very hearty Vote of Thanks to Lord Aberconway for the very able way in which he has presided at our meeting. I think the Society is greatly to be congratulated in having so active, competent and eloquent a Chairman.

Mr. Cuthbertson: It is my pleasant duty to second that motion, and as Lord Aberconway could hardly put the motion himself, I ask you to carry it with very great applause.

(Motion carried with acclamation.)

The Chairman: Mr. Hanbury, Mr. Cuthbertson, Ladies and Gentlemen,—I thank you for the way this motion has been put and for the cordial way in which it has been received. It is always a very great pleasure to preside over a meeting such as this.

That, ladies and gentlemen, concludes our proceedings. I thank you for your attendance.

THE REPORT OF THE COUNCIL FOR THE YEAR 1933.

- r. Patron.—Your Council are gratified to be able to announce that His Royal Highness the Prince of Wales has honoured the Society by becoming a Patron, and, further, that His Royal Highness the Crown-Prince of Sweden and Their Royal Highnesses the Duke and Duchess of York have become Fellows of the Society.
- 2. The Year 1933.—The general improvement in affairs horticultural is reflected in the increased numbers of new Fellows and Associates who have joined the Society during the year. The Society has thereby not only recovered the losses of 1931 and 1932 but starts the New Year with a Fellowship greater than ever before.

3. Numerical Strength .--

3. Humorious bucus	Parre.			
Loss by Deat	H IN	1933.		Fellows Elected in 1933.
Honorary Fellows	•••	•••	2	Patron 1
Associates of Honour	•••	•••	2	Associates of Honour 11
Life Fellows	•••	•••	8	Life Fellows 21
4 Guinea Fellows	•••	•••	5	4 Guinea Fellows 15
2 ,, ,,	•••	•••	196	2 ,, ,, I,248
I ,, ,,	•••	•••	186	I ,, ,, 2,288
Associates	•••	•••	I	Associates 84
			400	Affiliated Societies 54
Loss by Resi	GNA	TION.	400	3,722
4 Guinea Fellows			10	Deaths and Resignations 2,322
2 ,, ,,	•••		830	
I ,, ,,	•••	•••	962	NET INCREASE 1,400
Associates	• • •	•••	73	anage and a second a second and
Affiliated Societies	•••	•••	47	Total on November 8, 1932 26,997
				Total on November 7, 1933 28,397
			1,922	(Highest total, 1930 28,026)

- 4. Obituary.—Among those whose loss the Society has to deplore may be mentioned four holders of the Victoria Medal of Honour: Lady Aberconway, a great amateur gardener; Mr. Wm. Atkinson, a noted horticulturist of North England; Sir Daniel Morris, who was Treasurer of the Society from 1888 to 1891; Dr. O. Stapf, an Honorary Fellow of the Society, who not only edited on behalf of the Society "Curtis's Botanical Magazine" from 1920 until the date of his death but who was likewise the Editor of the "Index Londinensis"; Dr. Erwin Baur, Direktor des Kaiser Wilhelm-Instituts für Züchtungsfarschung, Müncheberg, and Sir Frank Baines, C.V.O., C.B.E., late Director of Works, H.M. Office of Works, Honorary Fellows of the Society. The Society has also lost two Associates of Honour: Mr. J. Jones and Mr. T. Pateman, a member of the Fruit and Vegetable Committee; and valuable supporters in Monsicur J. L. de Vilmorin; Mr. Avray Tipping, the well-known garden architect and writer on horticultural matters; Mr. F. Barchard, a member of the Narcissus and Tulip Committee; Mr. R. Paterson, a member of the Orchid Committee and an amateur exhibitor of orchids, Mr. William Kelway and Mr. Robert Fife.
- 5. Fortnightly Meetings and Shows.—The Fortnightly Meetings and Shows at the Halls have been well attended throughout the year and the invitations issued on certain evenings to the staff of some large business organizations have been appreciated. The Council has, however, decided that the closing hour on the first day of two-day Shows during the coming year shall be 7.30 instead of 9 P.M., as it has been found that the attendance after 7.30 is not large.

 The attendances at Fortnightly Shows to date have been :—

1932 110,586 including 4,878 special visitors.

1933 113,374 including 4,915 special visitors.

- 6. The Daffodil Show.—In spite of the rather early season, the Daffodil Show, which was held on Tuesday and Wednesday, April 11 and 12, attracted numerous entries and the exhibits were of high quality. In view of the popularity of this flower, it has been decided to hold a Daffodil Conference in 1935, and, in this connexion, special arrangements are being made at Wisley for the display of decorative garden varieties of Daffodils. The Daffodil Show in 1934 will be held on Tuesday and Wednesday, April 10 and 11.
- 7. Early Market Produce Exhibition.—A special exhibition of early market produce (flowers and vegetables) was staged in the Old Hall on Tuesday and Wednesday, April 25 and 26. The Show was opened by Mr. Walter E. Elliot, M.P., the Minister of Agriculture, and, in view of the public interest and of the marked importance of exhibitions of this kind, it has been decided to hold a similar exhibition in 1934, on Tuesday and Wednesday, April 17 and 18, when a special discussion on "Quality in Early Vegetables" will take place.
- 8. The Chelsea Meeting.—The Chelsea Meeting was held on Wednesday, Thursday and Friday, May 24, 25 and 26, and was again honoured by a gracious visit from Their Majesties the King and Queen. The exhibition compared very favourably with those of previous years but, owing to the early season, the character of the exhibits was somewhat different. This event will be held in 1934 on Wednesday, Thursday and Friday, May 30, 31 and June 1.
- 9. The Amateurs' Flower Show.—The ninth Amateurs' Flower Show was held on Tuesday, June 27; there were more exhibits than in the previous year and the Hall was well filled. In 1934 the Show will be held on Tuesday, June 19.
- 10. British-grown Bulb Show.—At the Fortnightly Meeting on Tuesday and Wednesday, August 29 and 30, an exhibition of British-grown bulbs was staged; it received a more encouraging support than in 1932 and demonstrated growing interest in the development of the British-grown bulb industry. In view of the success attained it has been decided to hold a British-grown Bulb Show in 1934 on Tuesday and Wednesday, August 28 and 29.
- rr. The Autumn Show.—The first large Autumn Show to be held since 1927 was held on Wednesday, Thursday and Friday, September 27, 28 and 29, in the National Hall, Olympia. The Hall was well filled with a very fine display of exhibits and the Show attracted a large attendance of the Fellows and the public. Owing to the engagements of the National Hall, Olympia, the Council has not been able to make arrangements to hold a Show there in 1934; it has, therefore, been decided to hold the Show at the Crystal Palace on Wednesday, Thursday, Friday and Saturday, September 19, 20, 21 and 22. It is hoped that the Show will receive the full support of Fellows and, in order to increase its attraction and usefulness, the customary competitive Fruit and Vegetable Show, together with a Conference on Apples and Pears, will be held there at the same time.
- 12. Lily Conference.—The Lily Conference, with its Exhibition, was held on Tuesday, Wednesday and Thursday, July 11, 12 and 13, and was perhaps the most outstanding feature of the year's work. The Show was honoured by the presence of H.R.H. Prince of Wales. The Conference was opened on Tuesday, July 11, with an Address of welcome by the President, The Hon. Henry McLaren. The rest of Tuesday afternoon, the whole of Wednesday, and Thursday morning were devoted to the reading of papers and discussions on a wide range of subjects dealing with the cultivation, propagation, hybridization and diseases of Lilies. On the Thursday afternoon there was an excursion to the Royal Botanic Gardens, Kew, and on the Saturday to the private gardens of Mr. E. A. Bowles and Dr. Fred Stoker to see Lilies.

The Council desires to take this opportunity of placing on record its appreciative thanks to the members of the Lily Committee, the Director of the Royal Botanic Gardens, the readers of papers, and owners of private gardens.

The report of the Conference, including not only the papers read but also the discussions to which they gave rise, has been published in the "Lily Year-book, 1933."

13. The Lily Group.—A Lily Group was formed at the beginning of 1933 to enable those specially interested in Lilies, Nomocharis and Fritillaries to meet and exchange views. Membership is open, without additional subscription, to all Fellows and Associates of the Society, and members of the group are notified

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by post of all Group meetings. Those who wish to join should apply to the Secretary. During the past year the Group held four meetings, and a similar programme has been arranged for 1934.

14. The Fruit Conference.—The Fruit Conference in 1934, as previously stated, will be held in conjunction with the Fruit and Vegetable Show at the Crystal Palace on Wednesday, Thursday, Friday and Saturday, September 19, 20, 21 and 22. The Conference will be divided into three groups—an amateurs' day, when the methods of summer and winter pruning, etc., will be discussed; a scientific day for questions of nomenclature and synonymity and of fruit culture as affected by conditions; and a market-growers' day, when the trials at Wisley, new varieties, pears from a commercial aspect, and storage of fruit will be dealt with.

The advance programme of the Conference will be found in the Book of Arrangements.

- 15. The Ghent Floralies.—In connexion with the 125th anniversary of the Ghent Floralies Exhibition of the Ghent Royal Society of Agriculture and Botany, the Society staged a group of new and rare plants of recent introduction which, although not of a spectacular nature, nevertheless attracted a great deal of interest amongst the foreign horticulturists and botanists. The Council desire to thank the Director of the Royal Botanic Gardens at Kew and the Director of the Royal Botanic Gardens, Edinburgh, as well as the owners of private gardens and the firms who so generously contributed plants which together with those from the Society's gardens formed the exhibit.
- 16. South African Wild Flower Exhibition.—The Society's Old Hall was lent for the exhibition of a unique collection of the Flora of South Africa to the South African Wild Flower Committee. This show took place on Tuesday and Wednesday, October 24 and 25, and received a Gold Medal of the Society.
- 17. Wisley.—The continuous sunshine of the past summer materially shortened the flowering period of herbaceous plants. Its effect on flowering trees and shrubs cannot yet be estimated, though it might reasonably be expected to produce a wealth of bloom in 1934. During the summer the new borders devoted to hybrid Roses, the rearranged Azalea garden and the newly planted greenhouse have attracted considerable attention. Minor alterations are now in progress, such as the removal of the Paeonies from the position which they have occupied for some years. New herbaceous borders will occupy the space made vacant by the removal of the Paeonies.
- 18. Collection of Lilium Species.—Efforts are being made to increase the colection of Lilium species in the gardens and many are now being raised from seeds and scales. Nomocharis seedlings are also being raised in the endeavour to establish this genus at Wisley.
- 19. Demonstrations of Garden Operations.—These demonstrations, instituted this season, have proved their popularity and interest to Fellows and their friends, and were all well attended. On one occasion eighty persons were present. They will be continued during 1934 as follows: March 14 and 15, "Seed Sowing—Indoors and Outdoors"; March 21 and 22, "Rose Pruning"; April 11 and 12, "Spring Spraying of Fruit Trees"; July 18 and 19, "Summer Pruning Fruit Trees"; November 14 and 15, "Planting Fruit Trees and Roses," and December 5 and 6, "Pruning Fruit Trees."
- 20. Trials.—The trials in progress during 1933 other than those of the standard collections included Sweet Peas, Marigolds (Calendula and Tagetes), Perennial Phlox, Pyrethrums and Perpetual Carnations. Dahlias, in spite of the drought, were this year particularly good, both foliage and flowers being well developed. The vegetable trials, consisting of Spinach and Carrots on the almost pure sand of the vegetable ground, suffered so badly from the drought that they were not considered to be sufficiently characteristic to be judged.
- 21. Investigations and Experiments.—Physiology, etc.—Dr. Tincker has continued the study of the effects of controlled periods of light on plants, and further published accounts of this work have appeared in the JOURNAL, the "Annals of Botany," and elsewhere.

"Annals of Botany," and elsewhere.

A survey of Lily soils was made for the Lily Committee and Conference, and a report written with Sir Daniel Hall's co-operation has been published in the

"Lily Year-book, 1933." Other investigations concerned with Lilies have been commenced and observations upon the drainage, water conditions, and the growth of Lilies in various soils have been recorded. Empirical observations upon the growth of Gentians and other plants in different soils have also been made. A paper on the germination of Gentians has been published in the Journal by Professor Weiss.

Other germination studies include those on various rosaceous seeds and fruits. Tests with Sodium Chlorate as a weed killer have been continued and

a report prepared.

Entomology.—Mr. Fox Wilson published a further contribution to the study

of Insect Pollinators of Fruit Trees.

He has continued his investigations of the Eelworms attacking Phlox and has recorded new host plants as being susceptible to this strain of the parasite.

Pests of Iris have also received particular attention and this work will be reported on in the Iris Society's Journal.

A progress report of the study of the biology of the Rhododendron White Fly will be published in the Society's Journal.

Continued observations on the pests of new plants have included many new records made during the year of host plants and new parasites.

The intensive study of the pests of seed, especially the Bruchid Beetles, has

been continued.

This year all Fellows applying for parasitized material of the Greenhouse White Fly have been supplied with their requirements. Close co-operation has been maintained between the Entomologist and workers at the Imperial College of Science, and with Helminthologists.

Mycology.—Mr. Green has concluded his work on the Black Spot of Roses; two reports on this disease and its control and varietal resistance of various roses may be consulted in the JOURNAL. The work on Dahlia Smut disease

(caused by Entyloma) has also terminated.

Other mycological problems receiving attention are concerned with Hollyhock Rust, "Ink Disease" of Irises and diseases of Delphiniums.

Narcissus Investigations.—Mr. Gould briefly described some of his observations on the effect of hot-water treatment against Eelworm attack upon the subsequent growth of Daffodils to the Fellows of the Society at a fortnightly meeting.

He has concluded his work on the control of "Basal Rot" where a change of

soil from wet to well aerated conditions has checked this trouble.

A report on these Narcissus investigations will appear in the "Daffodil Year-book."

During the year, at the primary request of the Narcissus Committee, an extension of these investigations took place, the attention of the investigator being directed towards the Yellow Stripe Disease believed to be caused by a

- 22. Advisory Work.—The Entomologist and Mycologist report that particularly common pests and diseases this year include Sawfly attacks on ornamental plants and on fruit; Rhododendron pests and Phlox Eelworm; Rust of Gooseberries and Antirrhinums, and diseases of Water plants and Delphiniums. The chemical advisory work has been supervised by the Keeper of the Laboratory working in conjunction with the Consulting Chemist.
- 23. Shows and Exhibits.—The Laboratory Staff has staged exhibits at the Great Spring Show (Chelsea), the Great Autumn Show (National Hall, Olympia), the Amateurs' Flower Show and other shows of the Society, and through these exhibits and the Information Bureaux an ever expanding number of enquiries has been answered.
- 24. Fruit for Commercial Purposes.—The trials of hardy fruits for commercial purposes, conducted under a Joint Committee of the Society and Ministry of Agriculture and Fisheries, and the collection of fruit maintained by the Society in connexion with the trials now occupy about 38 acres of land at Wisley. Many new varieties have been added to the trials and further selected varieties propagated and distributed to the ten sub-stations that are established in different parts of the country. A considerable increase in number of visitors to the fruit trial grounds at Wisley and at the sub-stations is recorded. The collection of some 1,400 varieties of all kinds of hardy fruits, maintained by the Society at Wisley to assist in the determination of questions of synonymy and for comparisons with new varieties, proves of great interest to amateur as well as commercial growers. These trials are catering for the special requirements of the

Fruit Canning Industry, as well as for the needs of commercial growers in every district.

25. Investigations and Experiments .-- Mr. Rawes has continued investigations into the self-fertility or sterility of Apples, Pears and Plums, and experiments to determine most suitable combinations of varieties for orchard planting.

The experiments with varieties of Asparagus to determine the cropping of male and female stocks and the effect of wide and close planting upon production

are being continued. A first report is in course of publication.

- 26. Lectures.—The Council wishes to record its thanks to the lecturers who assist so much at the Fortnightly Meetings and to Professor V. II. Blackman, F.R.S., who delivered the Masters Memorial Lectures on July 18 and 19, on "Plants in Relation to Light and Temperature." The Masters Memorial Lectures in 1934 will be held on Tuesday and Wednesday, May 8 and 9, when Dr. W. F. Bewley will speak on "Health and Disease in Plants."
- 27. Expeditions.—The Society has taken shares in two expeditions in search of new and rare plants, namely, an expedition to the Appalachian Mountains and the Coastal Plain Regions organized by the New York Botanical Garden and Mr. Edward Balls' expedition to the district of Trebizond and Erzeroum. It is hoped to have reports and seeds from Captain Kingdon Ward's expedition to Tibet during the coming year.
- 28. The Society's Publications.—It is gratifying to be able to report that Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, has consented to undertake for the Society the Editorship of the "Botanical Magazine," a post rendered vacant by the death of Dr. Stapf. During the past year four Parts of this Magazine have been issued.

Among other publications that have appeared are the "Lily Year-book, 1933," with the reports of the Conference, the "Daffodil Year-book, 1933," and

a new edition of the "Classified List of Daffodil Names."

29. Lindley Library.—The past two years have seen a progressive increase in the number of persons consulting the library and in the number of books lent to Fellows. The books have been arranged so that they can readily be found, and progress has been made with a subject index which will render the contents of the library more accessible than hitherto. Many volumes have been bound and 950 books and pamphlets have been added to the library during those years, among which the following may be mentioned: Aehrenthal's "Deutschlands Kernobstsorten" (3 vols.), Cusin and Ansberque's "Herbier de la flore française" (25 vols.), Dittrich's "Systematic Handbuch der Obstkunde" (3 vols.), Kniphof's "Botanica" (4 vols.), Vahl's "Icones illustrationi plantarum Americanum" and "Eclogae Americanae," Wight's "Spicilegium Neilgherrense" (2 vols.), Wijk's "Dictionary of Plant Names," "Le Vignoble" (3 vols.), by Mas and Pulliat, "Vilmorin's Blumengartneri" (2 vols.), by Voss and Siebert, and "Flora Sicula" (5 vols.), by Lojacono-Pujero.

Mr. Hutchinson, so well known to the Fellows using the Lindley Library. and progress has been made with a subject index which will render the contents

Mr. Hutchinson, so well known to the Fellows using the Lindley Library.

has retired after 36 years of conscientious service.

30. The Society's Examinations.—There has been a steady increase in the number of candidates entering for the Horticultural Examinations held annually by the Society. In 1934 the National Diploma in Horticulture was awarded to five candidates in Section 1, General Horticulture; and one candidate in Section 2, Hardy Fruit Growing. Twenty-eight candidates passed the Preliminary Examination and will be eligible for the Final Examination when six years of practical gardening have been completed.

The number of candidates for the General and Teachers' Examinations showed that young gardeners and school teachers realize the value of the Society's

certificates in their respective careers.

In 1933 the Society established the British Floral Art Diploma with the object of stimulating interest in this craft by the establishment of a Diploma. The examination is intended primarily for florists and florists' assistants. At the examinations held in May and November fifty-eight candidates presented themselves for examination. The Diploma was awarded to thirty-two candidates whose work showed a high standard of efficiency and artistic taste.

31. The Victoria Medal of Honour.—The Victoria Medal of Honour has been awarded to Mr. G. P. Baker for his work in the introduction and cultivation of new plants; Mr. J. Coutts for his services to horticulture; Sir John Farmer for his services to botanical and horticultural science, and Mr. George Shawyer for his work in the advancement of commercial horticulture.

- 32. The Associateship of Honour.—The Associateship of Honour has been conferred on Mr. John Alexander, Head Gardener to Mrs. Wauchope, of Niddrie, Craigmillar, near Edinburgh; Mr. Donald Allan, Manager of Messrs. Dobbie & Company's Seed Farm at Marks Tey, Essex; Mr. Thomas Beatty, of Messrs. Ben. R. Cant & Sons; Mr. J. Christy, Park Superintendent for the Metropolitan Borough of Camberwell; Mr. W. B. Clarke, Park Superintendent for the City of Aberdeen; Mr. George J. Ingram, Secretary of the Gardeners' Royal Benevolent Institution; Mr. W. R. Mustoe, O.B.E., late Superintendent of the Agricultural and Horticultural Department, Delhi, India; Mr. Bertram F. Perfect, Orchid-grower to Sir Jeremiah Colman, Bt., at Gatton Park, Surrey; Mr. Samuel Radley, of Messrs. Robert Veitch & Son, Ltd.; Mr. Samuel Smith, Head Gardener to Mr. R. B. Fox, at Penjerrick, Falmouth, Cornwall; and Mr. Sydney W. Tucker, Head Gardener to the Earl of Radnor at Longford Castle, Salisbury, Wilts.
- 33. The Lawrence Medal.—The Lawrence Medal for the best exhibit staged at the Society's Shows during the year has been awarded to Messrs. Seymour Cobley, Ltd., for their exhibit of Bulbs on August 29.
- 34. The Holford Medal.—The Holford Medal for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Halls of the Society has been awarded to Mr. F. J. Hanbury, F.L.S., V.M.H., for his exhibit of Orchids on October 25.
- 35. The Veitch Memorial Medals.—Awards have been made as follows: A Gold Medal to Rt. Hon. Sir Herbert Maxwell, Bt., K.T., in recognition of his writings, paintings and other work for horticulture; a Gold Medal to Mr. A. Grove for the work he has done on Lilies; a Silver Medal and £25 to Mr. W. J. Bean for his supplementary volume on "Trees and Shrubs"; a Silver Medal and £25 to Mr. A. Simmonds for his work in organizing the Lily Conference as secretary thereof; and a Silver Medal to Mr. H. R. Hutchinson for his 34 years' service as Librarian.
- 36. The Cory Cup.—The Cory Cup has been awarded to Mr. F. L. Skinner for his Lilium \times 'Maxwill' shown on July 11, 1933, and which was judged to be the best new hardy plant of garden origin shown to the Society in the course of the year.
- 37. The Loder Rhododendron Cup.—The Loder Rhododendron Cup has been awarded to Mr. E. H. Wilding in recognition of his contributions to Rhododendron literature.
- 38. The George Moore Medal.—The George Moore Medal has been awarded to the Hon. Henry McLaren for Cypripedium \times 'F. C. Puddle,' Bodnant var., shown at the Great Autumn Meeting on September 27–29, 1933, and which was considered to be the best new Cypripedium shown to the Society in the course of the year.
- 39. The Sander Medal,—The Sander Medal has been awarded to Messrs. Allwood Bros. for the Perpetual-flowering Carnation 'Robert Allwood,' shown at Chelsea on May 24–26, 1933, and which was considered to be the best new greenhouse plant shown to the Society in the course of the year.
- 40. The Williams Memorial Medals.—The Williams Memorial Medals for the best groups of plants and/or cut blooms of one genus (fruit and vegetables excepted) which show excellence in cultivation exhibited during the year have been awarded to Messrs. H. G. Alexander, Ltd., for their exhibit of Cymbidiums, staged on March 7, 1933; and to Messrs. R. Bolton & Son, for their exhibit of Sweet Peas staged at Chelsea on May 24–26, 1933.
- 41. The Sherwood Cup.—The Sherwood Cup for the most meritorious exhibit at the Chelsea Meeting was awarded to Messrs. Sutton & Sons, Ltd., for greenhouse plants from seeds.

cii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- 42. The Coronation Cup.—The Coronation Cup for the best exhibit other than Roses on the occasion of the Autumn Show at the National Hall, Olympia, was awarded to Messrs. Sutton, for their exhibit of vegetables.
- 43. Gifts to the Society.—The Council desires to express its gratitude to many Fellows and friends of the Society for their generosity in gifts of books, seeds, plants, etc., and to thank Mr. K. D. Corsar for repeating his gift of a Cup for Auriculas, Major F. C. Stern for an important collection of Lilies, Miss Fox for a collection of photographs of Cornish gardens, and Messrs. Dobbie & Co., Ltd., for the presentation to the gardens at Wisley of a collection of 600 Roses.
- 44. Retiring Members of Council.—The Council desires to place on record its appreciation of the valuable services during their term of office of the retiring members of Council—Sir Arthur Hill, Mr. E. A. Bunyard and Major F. C. Stern—and to thank them on behalf of the Society. It is gratifying to know that they will continue to give their help and advice on the committees of which they are members.
- 45. The Press.—The Council wishes to thank the Press for its increasing interest in the affairs of the Society and for its generous support of, and goodwill towards, Horticulture generally.
- 46. Committees, Judges and Examiners.—The Society's best thanks are offered also to the members of its Committees and to the Judges and Examiners who, in spite of increasing calls on their time, are ever ready to come and give their counsel and assistance.
- 47. Staff.—The Council desires to take this opportunity to express the Society's gratitude to the Secretary and the administrative Staff for their continued loyal and diligent work.

Signed on behalf of the Council, HENRY McLAREN, President.

December 31, 1933.



		-			-
To Establishment Expenses—London.	£	s. d.	£	s.	d.
Rent, Rates and Taxes		5 2	~		
Salaries and Wages	7,088 1.	1 4			
Other Establishment Expenses, including					
Light, Fuel, Stationery, Professional Fees,	0				
and Renewals	4,857 1				_
,, Wisley-			15,084	19	6
Net Expenditure for Year, as per Separate					
Account			13,025	6	0
, PRINTING AND POSTAGE OF JOURNAL AND OTHER	1851 7	r =			
Publications	4,854 1 1,758	1 5 5 8			
Less onles and Advertisements	1,730		3,096	4	9
Staff Pensions	1,020 1	3 0	3,- 5-	7	9
Less Contributions by Staff, as per Scheme .		0			
, Meetings-			599	17	0
Expenses and Labour of Special and Other					
Meetings	3,250 1	3 11			
Less Receipts	473 I	1 3			
Spring Meeting:	2 777	7 8			
Expenses and Labour . £5,914 10 10	2,777	, -			
Sum allocated for Over-					
head Expenses . 500 0 0					
The second secon					
6,414 10 10 Less Receipts . 5,911 8 11					
	503	111			
Autumn Show:	503				
Expenses and Labour . 2,368 12 10 Sum allocated for Over-					
head Expenses . 250 0 0					
2,618 12 10					
Less Receipts 1,942 7 7					
	676	5 3			
			3,956	14	10
" CUPS AND MEDALS			301	18	2
,, Garden Inspections—					
Expenditure less Receipts			19	12	II
Trust Account—					
Purchase of Books	509	1			
Salaries, etc.	711 1				
,, Special Expenditure—			1,221	0	11
E. K. Balls Expedition	50	0	•		
Appalachian Mountain Expedition	24 10	4			
Donation, Royal Geographical Society .	10 (0			
,, British Colour Council		5 0			
,, London Children's Gardens.	10 10				
,, Gardeners' Royal Benevolent Inst. ,, Royal Gardeners' Orphan Fund .	52 10				
	21 (0			
Roads Beautifying Association	21 1	, 0			
,, Roads Beautifying Association . Payment to Exors. of Dr. Stapf.	21 0				
Payment to Exors. of Dr. Stapf	200 (_			
Payment to Exors. of Dr. Stapf	200 0 387 10	8			
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Chent Floralies	200 0 387 10 119	8 7 6			
Payment to Exors. of Dr. Stapf Pritzel Revision (Index Londinensis)	200 0 387 10 119	8 7 6 9 3			
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference	200 0 387 10 119 2	8 7 6 9 3	1,314		ı
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference " Botanical Magazine	200 0 387 10 119 2	8 7 6 9 3	1,314 782		1 9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference , Botanical Magazine , Examinations in Horticulture—	200 (387 10 119 (295 9 117 12	8 7 6 9 3 4 4			
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses	200 (387 10 387 10 119 (295 117 12	8 7 6 3 4 4 4 3 I			
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Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference BOTANICAL MAGAZINE EXAMINATIONS IN HORTICULTURE— Expenses Less Fees	200 (387 10 387 10 119 (295 117 12	8 7 6 3 4 4 4 3 I			
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses	200 (387 10 387 10 119 (295 117 12	8 7 6 3 4 4 4 3 I	782	3	9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses Less Fees "Old and New Halls Sinking Fund Appropriation "RESTAURANTS—	200 (387 10 387 10 119 (295 117 12	8 7 6 3 4 4 4 3 I	782	15	9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference BOTANICAL MAGAZINE EXAMINATIONS IN HORTICULTURE— Expenses Less Fees OLD AND NEW HALLS SINKING FUND APPROPRIATION RESTAURANTS— Proportion of Overhead Expenses	200 G 387 IG 119 7 295 IE 117 IZ	8 7 6 9 3 4 4	782	3	9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses Less Fees "Old and New Halls Sinking Fund Appropriation "RESTAURANTS—	200 G 387 IG 119 2 295 G 117 IZ 655 IS 536 IS	8 7 6 9 3 1 1 9	782	3	9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses Less Fees "Old and New Halls Sinking Fund Appropriation "Restaurants— Proportion of Overhead Expenses Deficit	200 G 387 IG 119 2 295 G 117 IZ 655 IS 536 IS	8 7 6 9 3 4 4	782 119 980	3	9
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses Less Fees "Old and New Halls Sinking Fund Appropriation "Restaurants— Proportion of Overhead Expenses Deficit "Balance being Excess of Revenue over Expen-	200 G 387 IG 119 2 295 G 117 IZ 655 IS 536 IS	8 7 6 9 3 1 1 9	782	3 0	0
Payment to Exors. of Dr. Stapf. Pritzel Revision (Index Londinensis) Associates of Honour (Badges) Ghent Floralies Lily Conference "Botanical Magazine "Examinations in Horticulture— Expenses Less Fees "Old and New Halls Sinking Fund Appropriation "Restaurants— Proportion of Overhead Expenses Deficit	200 G 387 IG 119 2 295 G 117 IZ 655 IS 536 IS	8 7 6 9 3 1 1 9	782 119 980	3 0	0

								-			-	and the same of the last	
Ву	Annual Sui	SCRIPTIO	NS	•	•	•		£	s.	d.	£ 12,508	s. 17	d. 8
,,	DIVIDENDS .	AND INTE	REST					442	3	10			
,,	Do.	Do.	DAY	vis Ti	RUST			51	8	10			
,,	Do.	Do.	DE	POSIT	INTER	REST		52	0	11			
											545	13	7
,,	Donations										I	11	6
,,	HALL LETTI	ngs, Gros	s.								5,288	16	8
,,		sitions— nounts pa uring the	aid by	7 Fell	lows v	vho h	ave				210	0	0
	RENT OF FR	EEHOLD I	ROPE	RTY (Wisley	7) .					288	7	9

	LIA	BILI	TIE	s.						
To Capital Funds Account					£	s.	d.	£ 232,388	s. 17	d. 0
,, Life Compositions, 31st D Less Paid by Life Fello				, diad	13,707	15	0			
during the year .				med .	210	0	0			
Add Life Compositions p	oaid d	uring	g the	year	13,497 619		0			
,, SUNDRY CREDITORS								14,117	5	0
On Open Accounts .					2,332	I	6			
Westminster Bank Ltd.	•	•	•	•	6,940	3	9	9,272	5	3
,, Appropriation to Wisley Renewals Fund—	DEPR	RECIA	TION.	ДИД				9,2/2	J	S
Awaiting Investment	•	•		•				250	0	0
,, To Subscriptions Paid in	Adva	NCE		٠				782	4	3
,, Depreciation and Renew	ALS F	'סאט		•				10,000	0	0
,, OLD AND NEW HALLS, SINI		Fune)							
As at 31st December, 19 Added to Fund, 1933			_ :	•	4,329 1,182		5 8			
Add Capital apprecia Reinvestment of Secu			Sale	and	1,166	1	ı			
Tioniv Columnia of Occor		•	•	•				6,678	3	2
Weather Insurance Fund	•	•	•	•				3,000	0	0
" Supplementary Pension I	аии?	•	•	•				1,917	7	1
" RESERVE AGAINST DEPREC								1,680	19	4
(Resulting from the Appreciati Capital Securities represent Fund and Weather Insurance	on on ing De Fund.)	Sale a precia	nd re- tion :	investn and Re	nent of newals					
,, Memorial and other Tru Balances in hands of Soc				arate						
Schedule	•	•	•	•				461	0	7
, REVENUE AND EXPENDITURE										
Balance as at 31st Dece Add Balance as per Re				endi-	5,189	12	0			
ture Account, 31st D					7,391	16	8			c
					Bell and the second			12,581	8	8
							£	293,129	10	4

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on the 3rst December, 1933. In the total of Assets, £293,129 10s. 4d., are included Investments and Cash amounting in all to a total sum of £23,737 10s. 2d., representing Depreciation and other Funds which are not available for the general purposes of the Society.

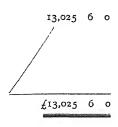
J. S. FEATHER, F.C.A., Auditor (Harper, Feather & Paterson, Chartered Accountants), 35 Great Tower Street, London, E.C. 3.

9th January, 1934.

ASSETS.			
By Capital Expenditure— Old Hall, Offices, Restaurant,	d. £	s.	d.
Library, and Equipment, 31st December, 1932 77.599 14 0 Additions during 1933 42 6 0	0		
New Hall, Restaurant and Equipment,31st December, 1932 167,655 7 10 Additions during 1933 . 50 15 0			
167,706 2 1			
,, Freehold Property, Wisley	245,348 13,103		11
,, Botanical Magazine— Stock 100 o Work in Advance 671 13 1	o :o		
Depreciation and Renewals Fund In-	~ 77 ^I	13	10
VESTMENT AT COST, as per Schedule (Market value of Investments at 31st December, 1933, £10,069 1s. 3d.)	10,000	0	0
,, OLD AND NEW HALLS SINKING FUND INVEST- MENTS AT COST, as per Schedule— Investments as at 31st December, 1932 . 4,329 15	5 8		
Added to Fund, 1933 1,182 6 Add Appreciation on Sale and Reinvest- ment	Š		
(Market value of Investments at 31st December, 1933, £6,672 11s. 8d.)			•
WEATHER INSURANCE FUND INVESTMENTS AT	6,678	3	2
Cost, as per Schedule	3,000	0	0
,, SUPPLEMENTARY PENSION FUND INVESTMENTS AT Cost, as per Schedule 1,755 o Add Cash awaiting Investment	8 5		
parallel (All All All All All All All All All A	1,917	7	I
,, DEPRECIATION OF INVESTMENTS FUND INVEST- MENTS AT COST, as per Schedule (Market value of Investments at 31st December, 1933, £1,701)	1,680	19	4
" Wisley Adjustment Account	154	9	6
,, Sundry Debtors and Payments in Advance	2,442	4	3
,, Cash at Bank and in Hand	623	5	5
,, GENERAL INVESTMENTS AT COST, as per Schedule (Market value of Investments at 31st December, 1933, £7,406 9s. 10d.)	7,410	2	0
	£293,129) 10	4

					£	s.	d.	£	s.	d.
To Establishment Expenses—					~			~		
Salaries and Wages .					2,114	19	II			
Rates, Taxes and Insuran	ce				386	18	4			
Miscellaneous, including D	onati	ons			758	13	8			
Annuities	•	•	•	•	22	15	0	3,283	6	11
,, Laboratory and School of	Hori	CULT	URE							
Salaries					2,193	8	4			
Miscellaneous					163	6	9			
Depreciation					76	18	4	2,433	13	5
Garden—								~1755	- J	J
Salaries and Wages .					6,700	۲R	6			
Plant Distribution .	•	•	•	•	874					
Miscellaneous	•	•	•	٠	930	•	5			
Depreciation	•	•	•	•		3	6			
Depreciation	•	•	•	•	437			8,943	12	11
"Staff Pensions		•			495	3	7			
Less Contributions by Sta	ff, as	per Sc	heme		247	12	0			
								247	II	7
							£	14,908	4	10
To Balance, brought down		•		٠				12,275	I	11
"Special Expenditure—										
Purchase of Motor Lorry					276	0	0			
Purchase of Motor Car (ne	et)				197	0	0			
Boundary Fencing to Far	m (La	bour)			127	9	ı			
Repairs to Drive .	•				149	15	0	750	4	I
		•					£	13,025	G	0

•	•	•	•	£	s.	d.	£ 1,095	s. 3	d.
GRANT			•				549	18	7
Receipts	3.			190	7	2			
Postages	and	Packi	ing						
•	•	•	•	797	13		988	0	5
•		•	•			I	:2,275 /	I	ıı
						/			
						,			
				/	/				d.
				l		£	14,908	4	10
	Receipts	Receipts.	Receipts		GRANT	GRANT	Receipts 190 7 2 Postages and Packing	GRANT	Receipts 190 7 2 Postages and Packing



LIABILITIES. To Capital Funds Account		THE STATE AND STATE OF	
, Vincent Square Adjustment Account	Manager 1974 - 11 months		
### Less Capital Depreciation on Sale and Reinvestment of Securities	To C	APITAL FUNDS ACCOUNT	£ s. a. £ s. a. 35,870 7 8
Less Capital Depreciation on Sale and Reinvestment of Securities	,, V	INCENT SQUARE ADJUSTMENT ACCOUNT	154 9 6
As at 31st December, 1932 6,611 19 3 Add Capital Appreciation on Sale and Reinvestment of Securities 652 7 2 Added to Fund, 1933	,, 1E	Less Capital Depreciation on Sale and Reinvestment of Securities. (The difference between this Fund and the Investment Account on the Assets side is due to a change in the Investments which was made in 1921, and to the writing off of	115 11 0
£06,766 o 6	,, I	Depreciation and Renewals Fund— As at 31st December, 1932	652 7 2 250 0 0
			£66,766 o 6

And the control of th			-				77.
ASSETS.				_			_
By Capital Expenditure—	£	s	•	d.	£	s.	d.
Laboratory, Dwelling Houses, Glass Houses, Ranges, etc	; ;			3	3,371	10	10
Asset only so long as the Gardens continue to be used by the Society.	;						
"Fuel Stock					50	0	0
,, PLANT, LIVE STOCK AND LOOSE EFFECTS (as valued by the Director)—	5						
As at 31st December, 1932	2,60 17	75					
Less Depreciation of Garden and Laboratory	2,78	33 54		4			æ
Library					2,519	11	6
As at 31st December, 1932		39 22		3 3	562	7	6
,, Endowment Trust Fund Investments at Cost, as per Schedule—	r				302	′	Ü
Investments		43 25	3	6	aa m. 0		
,, Depreciation and Renewals Fund Investments at Cost, as per Schedule—					22,748	4	3
Investments as at 31st December, 1932 Add Appreciation on Sale and Reinvestment (Market value of Investments at 31st December, 1933, £8,428 16s. 7d.)		11 52	7				
Add Appropriation awaiting Investment	. 7,2	64 50	6	5		. 6	5 5
				£	66,766		6
					and the second	Consider.	

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1933. In the total of Assets, £66,766 os. 6d., are included Investments and an Appropriation amounting in all to a total sum of £30,262 10s. 8d., representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., Auditor (HARPER, FEATHER & PATERSON, Chartered Accountants), 35 Great Tower Street, London, E.C. 3.

9th January, 1934.

ROYAL HORTICULTURAL SOCIETY-TRUST

					Amount	of F	hau				
					represe Investn	nted ients st,	by at	Income l in h 31st Dec	and		
					£	s.		£	s.		
I.	Alfred Davis Trust Fund	٠	•	•	946	0	3		ni	ı	
2.	WILLIAMS MEMORIAL FUND	•		•	241	ττ	rı	14	9	2	
3.	MASTERS MEMORIAL FUND .				542	17	O	127	0	10	
4.	NICHOLSON MEMORIAL FUND				186	15	7		nii	l	
5.	Schröder Pension Fund .				557	14	б	6	6	8	
6.	LINDLEY LIBRARY TRUST .	٠	•		12,441	17	8	(a)	nil	!	
7.	SIR JAMES KNOTT TRUST .		•		600	0	0	69	4	3	
8.	VEITCH MEMORIAL TRUST FUND		•		1,677	ıı	2	181	9	I	
9.	Moore Medal Trust				190	10	6	15	3	ΙI	
IO.	SEWELL MEDAL TRUST FUND				521	9	5		nii	l	
II.	Mrs. Sherman Hoyt Prize Fun	ďD	•		207	7	10	12	15	ı	
12.	LORD RIDDELL TROPHY FUND				175	0	0	0	ΙI	2	
13.	DEDICATIONS VOLUME FUND (Botanical Magazine) .				112	0	0		ni	l	

Notes on above Funds:

- Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine.
- 2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals.
- 3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of one or more annual lectures.
- 4. Raised by donations in 1908 in memory of the late Mr. Geo. Nicholson to provide prizes for Wisley students.
- 5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benovolent Institution for one pension.
- 6. The nucleus of the library is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the books purchased by the Society and by the gifts of private donors.

Divid Interes duri £ 51	st red ng 1	ceived 933.	with	acco	dance d .	e in han	ds of Dec.	, 1933 d.	S
10	3	4	9	10	0	15	2	6	Cost of Books pur- chased by the
17	10	0	20	0	0	124	10	10	Society up to
6	9	8	6	9	8		nil	!	31st Dec., 1932 10,473 13 0
20	0	0	20	0	0	6	6	8	Books purchased by the Society
745	14	0 (8	b) 745	14	0		nil	!	in 1933 509 9 1
25	3	0		nil		94	7	3	(72.117.77.8
78	12	5	97	0	6	163	I	0	£12,441 17 8 —————
7	16	6	10	7	6	12	12	II	
25	10	8	23	15	0	I	15	8	(b) Includes contribution by the
10	8	0	7	8	0	15	15	I	Society in 1933, £711 11s. 10d.
7	12	10	7	7	6	0	16	6	(c) Includes proceeds of sales during 1933 amounting to
26	12	2 (c)	nil		26	12	2	£22 to be invested.
Total	as	per I	Balance	She	et .	£461	0	7	

- 7. Presented to the Society in 1920 by Sir James Knott for the purpose of providing a scholarship tenable at Wisley.
- 8. Instituted in 1870 in commemoration of the late Mr. James Veitch for the encouragement of Horticulture. Fund vested in Society in 1922.
- 9. Presented to the Society in 1926 by the late Mr. G. F. Moore to provide a medal annually for the best new Cypripedium shown to the Society during the year.
- 10. Presented to the Society in 1928 by the late Mr. A. J. Sewell to provide medals for Rock Garden Plants.
- 11. Presented by Mrs. A. Sherman Hoyt in 1929 as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents.
- 12. Presented by Lord Riddell in 1931 to provide a trophy annually to be awarded for vegetables.
- 13. Proceeds of the sale of Curtis's Botanical Magazine Dedications, 1827–1927, presented in 1932 to the Society by Mr. William Cuthbertson, V.M.H., to be devoted to publications.

ROYAL HORTICULTURAL SOCIETY—SCHEDULE

The second state and a second state and the second

The state of the s						
Depreciation and Renewals Fund, Vincent	Non	inal		C	ost.	
Square-	£,	s.	d.	£	s.	d.
Conversion Loan, 31%, 1961	, .	12		īī	5	10
$\frac{3\%}{1948}$, $\frac{1948}{1953}$	2,450			2,384		8
Hertfordshire County Council, 3% Red. Stock,	1,107		0	1,076	9	8
Cornwall County Council, 3% Red. Stock,	1,107	•	0	1,056	8	8
Middlesex County Council, 3% Red. Stock,	830	•			6	
Metropolitan Water Board, 3% E Stock,			3	799		3
1953–1973 Conversion Loan, 2½%, 1944–1949	2,113 2,768	4 7	4 5	1,979 2,580	9 16	7 11
Plymouth Corporation, 24% Red. Stock, 1918–1958	225	9	4	ııı	G	5
	10,622	5	2	10,000	0	0
One was New Years Comment Property	Single State of State		2000	en macura analoga		in Addresia
OLD AND NEW HALLS SINKING FUND— Conversion Loan, 3%, 1948–1953.	2,371	ıı	8	2,302	10	9
Hertfordshire County Council, 3% Red Stock, 1948–1953	632	8	5	614	15	ıı
Cornwall County Council, 3% Red. Stock 1953-1963	632	8	5	603	6	10
1940-1953	474	6	4	456	10	0
1953-1973	1,307		7	1,227	0	6
Conversion Loan, 2½%, 1944–1949	6,998		-2 7	6,678		2
	0,990	10	-	0,078	3	Z.
WEATHER INSURANCE FUND—						
War Loan, 3½%, 1952	3,032	15	II	3,000	0	٥
Commence of Desires Property						
Supplementary Pension Fund— Conversion Loan, 3½%, 1961	0.723	T 2	^	T 77 7	o	8
Conversion Loan, 5g /0, 1901	2,132	F,3	-	1,755		estumen'
Depreciation of Investments Fund—						
Conversion Loan, 3%, 1948-1953	1,696	4	3	1,646	10	8
$3\frac{1}{2}\%$, 1961	33	19	3	34	2	8
	1,730	3	6	1,680	19	4
General Investments— Conversion Loan, 3%, 1948–1953	2,670	2	o	2,592	7	4
Hertfordshire County Council, 3% Red. Stock	712	o	7	692	3	8
Cornwall County Council, 3% Red. Stock	712	0	7	679	5	9
Middlesex County Council, 3% Red. Stock 1948–1953	534	o	5	513	19	2
1953-1973	1,358	16	0	1,272	16	4
Conversion Loan, 2½%, 1944–1949	1,780	1	4	1,659	9	9
	7,767	0	1.T	7,410	2	O

	Not	nin		Cos		_
Wisley Endowment Trust Fund—	£	s. 	d. -	£	s.	d.
Conversion Loan, 3½%, 1961	2,588 3,904		0	2,105 3,790	3 17	6 5
Hertfordshire County Council, 3% Red.			•	31790	- /	J
Stock, 1948-1953	1,041	4	3	1,012	3	II
1953-1963	1,041	4	3	993	6	9
1948–1953	780	18	2	751	11	5
1953-1973	1,987	0	0	1,861	5	3
Conversion Loan, 2½%, 1944–1949	2,603 1,647	o 5	.8 I	2,426 1,580		1 7
London County, 5% Cons. Stock, 1940-1960.	600	0	ō	505		0
Metropolitan Cons., 2½% Stock, 1919–1949 . Plymouth Corporation, 6% Red. Stock, 1940–	970	0	0	499	12	0
1950	, 30	9	4	29	6	4
1918–1958	400	0	0	197	I	0
Bristol Corporation, 21% Red. Deb. Stock	600	0	0	278		6
Canadian Pacific, 4% Perp. Cons. Deb. Stock Buenos Ayres Gt. Southern Railway, 5% Non-	4,632	0	0	3,890	17	6
Cum. Pref. Stock	2,500	0	0	2,825	0	0
City of Moscow, 4½% 1912 Stock (Written off)	6,000	0		******************	_	
	31,326	9	10	22,748	4	3
	Es and Proposition of	NICHT VICE	MENDALI	REDADE DATABLE DATABLE		eireum
Depreciation and Renewals Fund, Wisley-						
Conversion Loan, 3%, 1948–1953	1,901	4	2	1,845	17	2
Hertfordshire County Council, 3% Red. Stock, 1948–1953	506	19	9	492	17	2
Cornwall County Council, 3% Red. Stock, 1953-1963	506	19	9	483	13	7
Middlesex County Council, 3% Red. Stock,	200			26=		_
1948–1953	380		10	365		2
1953-1973	967		4	906		8
Conversion Loan, 2½%, 1944–1949 London County, 5% Cons. Stock, 1940–1960.	1,267 785	9 5	5 3	1,181 661		4
Metropolitan Consolidated 2½% Stock, 1919—	7~3	J	J	001	-3	•
1949	1,287	9	2	662	19	3
Plymouth Corporation, 23% Red. Stock, 1918–1958	288	8	10	142	I	0
Plymouth Corporation, 6% Red. Stock, 1940-					_	-
Bristol Corporation, 2½% Red. Deb. Stock .	159 795		4 6	151 369		4
Bristor Corporation, $2\frac{1}{2}/_{0}$ Red. Deb. Stock .				309		3
	8,847	4	4	7,264	6	5
		Married Scale	out one place	The State of the S	MA SIPPLE	MICHARDO.
Alfred Davis Trust Fund—						
London County, 5% Cons. Stock, 1940-1960. Metropolitan Consolidated, 2½% Stock, 1919-	375	0	0	316	0	0
1949 Plymouth Corporation, 2½% Red. Stock,	610	0	0	314	4	0
1918–58	200	0	0	98	10	6
Plymouth Corporation, 6% Red. Stock,	32	7	4	31	2	3
Bristol Corporation, 2½% Red. Deb. Stock .	400			186	3	6
	1,617	7	4	946	0	3
	Number of Street, or other party of the last of the la	No.	Series d	-		

SCHEDULE OF INVESTMENTS, 31st DECEMBER, 1933.

Williams Memorial Fund—	Nominal. f , s , d .	Cost. \pounds s. d.
East Indian Railway £7 Annuity, Class "B," 1953 Conversion Loan, 3½%, 1961 Metropolitan Water Board, 3% E Stock, 1953-1973	168 o o 55 I 9	168 0 0 41 9 4 35 2 7
. 333 - 373	260 11 10	244 II II
Masters Memorial Fund— L.M.S. Railway, 4% Preference Stock	250 0 0 250 0 0	290 I3 6 252 3 6
	500 0 0	542 17 0
Nicholson Memorial Fund— Metropolitan Water Board, 3% E Stock, 1953–1973	199 7 10	186 15 7
Schröder Pension Fund—Great Western Railway, 4% Deb. Stock .	500 0 0	557 14 6
Lindley Library Trust Fund— L.M.S. Railway, 4% Pref. Stock	1,137 0 0	1,458 15 7
SIR JAMES KNOTT TRUST FUND— Agricultural Mortgage Corporation, Ltd., 4½% Deb. Stock	558 19 5	600 o o
VEITCH MEMORIAL TRUST FUND— Victoria Government 5% Inscribed Stock, 1932-1942	1,354 0 1 319 19 0 3 11 9	1,354 O I 319 19 O 3 12 I 1,677 II 2
Maria Maria Para		
Moore Medal Trust Fund— Agricultural Mortgage Corporation, Ltd., 4½% Deb. Stock	173 19 8	190 10 6
Sewell Medal Trust Fund— Conversion Loan, 5%, 1944—1964. Metropolitan Water Board, 3% E Stock,	40I 5 7	400 O O
1953-1973	129 13 7	121 9 5
	530 19 2	521 9 5
Mrs. Sherman Hoyt Prize Fund— Conversion Loan, 5%, 1944–1964	208 I 2	207 7 10
LORD RIDDELL TROPHY FUND— Conversion Loan, 3½%, 1961	218 4 9	175 0 0
Dedications Volume Fund (Botanical Magazine Conversion Loan, 3½%, 1961)—	112 0 0

SCIENTIFIC COMMITTEE.

September 11, 1933, Mr. G. W. E. LODER, M.A., in the Chair, and seven other members present.

Hazel with branched cathins.—Dr. Tincker showed a form of Corvlus Avellana with densely branched male catkins, which he said was a constant character of

the tree from which they came.

Wheatear Dianthus.—Mr. Fraser showed a wheatear form of inflorescence which had occurred on a seedling Dianthus of unknown origin, but possibly a

carnation hybrid.

Gaillardia flowers proliferous.—He also showed a remarkable proliferation in a Gaillardia flower, which had given rise to several stalked structures bearing five-lobed calyces, from each of which sprung a carpophore bearing at its apex a head of small flowers.

Ailanthus glandulosa fruiting. -- Mr. Loder showed fruits of Ailanthus glandulosa

from his garden at Ardingly in some of which seeds were developing.

Alstroemeria campaniflora.—This plant was referred to the Committee from Floral Committee B, before which it had been exhibited by Major Pam. It is a remarkable though not showy species of Alstroemeria about 3 feet 6 inches in height with lanceolate leaves rounded at the base, about 6 inches long, attenuated, and with an umbel of pendulous green tubular flowers about 2 inches in length. On the motion of Mr. Fraser, seconded by Mr. Grove, a Botanical Certificate was recommended for this plant.

October 10, 1933, Mr. A. D. COTTON, F.L.S., in the Chair, and eight other members present.

Nerine Seedlings .- Mr. Worsley showed some beautiful seedling Nerines which he had raised.

Amaryllis Belladonna, white-flowered.—He also showed a white-flowered Amaryllis Belladonna, with several flowers in the head, which he had received from Australia, and

Zephyranthes candida major, a plant with large white flowers on stems fully 18 inches long. It is a native of Uruguay and not so hardy as the type.

Salix Lapponum.—Mr. Fraser showed dried specimens of the silvery grey

Salix Lapponum helvetica, and of the type S. Lapponum.
Channel Island plants.—Mr. E. G. Baker showed a number of plants collected in Alderney, including Gnaphalium undulatum, which is naturalized there, Euphorbia Peplus, Centaurea paniculata and Genista aetnensis, and a species of Ononis which was referred to Kew for naming.

A Banksia and a Melaleuca from Mr. Newman's interesting garden at Black-

pool, S. Devon, were referred to Mr. Baker for naming, and

Cotoneasters from Mr. Trotter were referred to Mr. Marquand through Mr. Cotton, as Mr. Marquand had been making a special study of the genus.

October 24, 1933, Mr. E. A. Bowles, M.A., V.M.H., in the Chair, and thirteen other members present, and Mr. van de Weyer, visitor.

Banksia, etc.—Mr. E. G. Baker reported that the plants referred to him at the last meeting from Mr. Newman's garden at Blackpool, Dartmouth, were Banksia marginata and Melaleuca hypericifolia.

Magnolia fruiting.—Mr. Marsden-Jones showed fruit with ripe seed of a Magnolia which Dr. Rendle took for identification.

Amaryllids.—Mr. Worsley showed Nerine flexuosa alba and a seedling with large flowers from it—the plant breeds true to colour. He also showed N. coruscans major, and an original plant of N. Bowdenii from Mr. Gumbleton's garden; a fruiting spike of Amaryllis Belladonna in which the pedicel had lengthened to 8 inches, contrasting with the rather short pedicels of the flowers;

and flowers of Zephyranthes candida major.
Salvia chimera.—Mr. van de Weyer showed a hybrid Salvia splendens between the purple and the scarlet forms, which in addition to the crimson of the hybrid bore purple and scarlet flowers and one flower half purple and half scarlet.

Salix sp.—Mr. Fraser showed a Salix from Shetland, where it was collected by Colonel Johnson, which had so far not been certainly named. It is possibly a hybrid with Salix Caprea as one of its parents.

Seedling Vicia angustifolia.—Mr. Fraser also showed seedlings of Vicia angustifolia, remarking upon the presence of reserve buds at the base of the stem of the seedling and upon the fact that the seed was found as a rule one or two inches below the soil surface, pulled there, he suspected, by contraction of the long primary root.

Echinops from Turkey.—A species of Echinops from Turkey was taken by

Mr. Ramsbottom for identification.

November 7, 1933, Mr. A. D. Cotton, F.L.S., in the Chair, and twelve other

members present.

Mentha sp.—Mr. Fraser showed two new varieties of Mentha rubra which he had recently described, viz. M. rubra Toureffii from near Aberdeen and M. rubra Toddii from Cumberland and Cornwall, with long narrow leaves and bracts. He remarked that he was not sure whether these had arisen as bud sports or seedlings, but he had found vegetative sporting in Mentha cordifolia in his garden.

The use of the word "twitch."—Dr. Voelcker showed specimens of Agropyrum repens, Holcus mollis and Agrostis alba var. stolonifera, remarking that farmers in Bedfordshire were now applying the name twitch to all three species instead

of, as was once customary in the district, to the first only.

Lilium Catesbaei.—Mr. Hay sent for the Committee's inspection a specimen of Lilium Catesbaei in flower, raised from bulbs collected in Florida and flowered by him in Hyde Park.

Cyananthus pedunculatus var. crenatus.—He also showed flowers of this new variety (described by Mr. Marquand) of Cyananthus pedunculatus raised from

seeds collected in Nepal.

Chrysanthemum sport.—A sport of a pink chrysanthemum to a bright brown where all the flowers on one side of the shoot were of the latter, all on the other of the former colour, the terminal one half and half, was sent by Mr. Merson.

Fruiting of Wistaria floribunda.—Mr. Bowles showed fruits of Wistaria floribunda from his garden, remarking that usually one fruit only develops on a raceme, but this year in several instances two or three had developed.

November 28, 1933, Mr. F. J. HANBURY, V.M.H., in the Chair, and six other members present.

Lilium Catesbaei.—A Botanical Certificate was recommended for this un-

common species shown by Mr. T. Hay at the last meeting.

Schoenus nigricans and S. ferrugineus were shown by Mr. Fraser, the latter from Strath Tummel in Perthshire, where it appears to be native. S. nigricans occurs in bogs throughout the British Isles.

Bud development.—Mr. Hales showed buds of horse-chestnut with the leaves bursting out, and it was remarked that Aegle sepiaria was in flower.

Roots.-Mr. Mulligan sent from Bristol two plants of Asparagus in their second year, a root of one growing directly through another, in the same way as twitch sometimes pierces, for instance, a potato.

Jasminum officinale fruiting.—Fruits of Jasminum officinale were sent from the Isle of Wight. The fruits had this year been very freely produced, and in

several instances were quite ripe.

Ranunculus calandrinioides.-Mrs. Lukin showed a plant of Ranunculus calandrinioides which she had collected in Morocco. It was now in flower and

a Botanical Certificate was unanimously recommended.

Centaurea acaulis?—She also sent a Centaurea collected in the same area,

possibly C. acaulis, which the Committee desired to see again.

December 12, 1933, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Cones of Cedrus libani .- Mr. Fraser showed cones of Cedrus libani and remarked upon the variability of their size. He thought some produced this year were larger than usual.

Fasciated Forsythia.—Lady Heal sent a fasciated branched shoot of Forsythia. the stems being 2 inches broad in the widest part.

January 9, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

nine other members present.

Polyembrony in Sunflower.—Mr. Hales showed germinating "seeds" of Sunflower which had in two instances each produced two seedlings.

British species of Calamintha.—Mr. Fraser showed dried specimens of Calamintha baetica (which some regard as a hybrid) from Corfe Castle, C. Nepeta

from Babraham, Cambs., C. ascendens from Mickleham, Surrey, and its var. Briggsii from Kenford, Devon, and C. sylvatica from Apes Down, Isle of Wight, and drew attention to the differences between them.

Cones of Cedars.—Cones of Cedrus libani were shown by Mr. Bowles and Mr. Preston, the latter pointing out that the cones of this species at Cambridge are pointed and tapering, while those of C. atlantica, which are smaller there, were flat at the top. Mr. Fraser remarked that C. Deodara fruits at Stoke Park. It rarely produces cones in England, though the staminate flowers are frequent.

Cyclamen with foliose sepals.—Mr. Crane showed a flower of Cyclamen persicum in which the sepals were of the form of the foliage leaves, though smaller.

Cyclamen sporting.—Lady Cecil showed a plant of the same species apparently producing white flowers (with tinged stems) on one, red flowers on the other half. Lady Cecil was asked to ascertain whether the flowers of the two kinds were actually coming from one and the same corm, and if so, whether the two parts of the corm would continue to produce the same type of flower in future years.

Cypripedium triplex.—This hybrid between C. × Leeanum Clinkaberryanum and an unknown plant was shown by G. Mayer, Esq., of Wistler's Wood, Woldingham. It is peculiar in having a double dorsal sepal, three petals, and two staminodes. The lip appears normal, but there are traces of fasciation in the peduncle. It is said to produce similar flowers annually.

Lilium giganteum.—Mr. Scrase Dickens had planted bulbs of Lilium giganteum

too deeply at Coolhurst in order to ascertain the result. A photograph and sketches of a resulting bulb showed a piece of stem of one internode 2 inches long beneath the new bulb, still alive and with apparently functional roots at its base as well as at the base of the new bulb.

Plants for identification.—Several plants were sent for identification.

January 23, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and eleven other members present, and Mr. T. A. Lofthouse, visitor.

Campanula Bolosii.—Mr. Lofthouse showed photographs of this Spanish biennial species, the seed of which he had collected in Spain and grown in his

garden at Middlesbrough. It is nearly allied to C. speciosa.

Rosa farinosa.—Major Hurst showed drawings of Rosa farinosa, a plant new to the British flora which he had found in Cambridgeshire. It behaved like a Linnean species, coming true from seed, but was of hybrid origin, the two parents being R. eglanteria Q and R. mollis d. The latter was not native in Cambridgeshire, but had been introduced probably by birds; the former was native. Analysis of the chromosomes showed that the make-up of R. farinosa agreed with expectations from this parentage.

Salix daphnoides var. pomeranica.—Mr. Fraser showed dried specimens of this rare British Willow which had been found in Lancashire and in Midlothian. It has smaller leaves and catkins than the type or the var. angustifolia (S. pruinosa).

Effect of lightning.—Mr. Voulkes of Abbeville sent a photograph taken on the road to Dieppe last July after a thunderstorm, showing a wych elm, the trunk of which had been completely shattered when struck by lightning during that The bark had been stripped and was lying spread round the base of the tree, while the wood stood in giant splinters or was scattered on the ground (fig. 115).

Fasciated root of Pea.—Mr. B. O. Mulligan sent the root of a garden pea (one of two he had discovered) with two lateral roots fasciated and flattened. Fasciation, while extremely common in stems, has rarely been recorded in roots.

Hippeastrum hybrid.—Mr. Percy Lancaster of Alipur reported the raising of hybrids between Hippeastrum stylosum and H. reticulatum. The majority of the (65) seedlings raised had a white stripe down the middle of the leaf. letter was referred to Mr. Worsley.

Cyclamen flower aberrant.—Mr. R. D. Trotter sent a flower of Cyclamen persicum with the corolla markedly rotate and wholly in the vertical plane, not

reflexed as is normal.

February 6, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

eight other members present.

Viburnum species.—Mr. Fraser commented upon the apparent rarity in Nature of seedlings of Viburnum Opulus, a specimen of which he showed, contrasting the narrow cotyledons with the much broader ones of V. Lantana, seedlings of which are generally abundant near the parent species on chalky

Lonchocarpus sp.-Mr. E. G. Baker showed inflorescences of a species of Lonchocarpus which he had under investigation, in which a secondary branch

of the inflorescence seemed invariably to bear flowers of double the size of those produced upon the primary axis. All specimens he had seen showed this

peculiarity, the reason for which was not apparent.

Alchemilla sp.—Mr. Baker also showed specimens of an Alchemilla collected on Mt. Ruwenzori at 13,000 feet, with prostrate woody stems. The silky leaves and large stipules gave the shoot the aspect of a shrubby Potentilla. Mr. Baker The silky leaves said that ten species of Alchemilla of a similar habit were known from Ruwenzori.

Fruits of Prosopis julifera .- Mr. Hales showed fruits of this plant, which is grown in America for fodder, to draw attention to the sweet mucilage in which

the seeds are embedded.

Fruiting of Banana.—A photograph of a banana growing in the garder Mrs. Cooper Turner at Marlow House, Kingston-on-Thames, was shown. -A photograph of a banana growing in the garden of

exhibited a very large bunch of well-developed fruits.

Hippeastrum sp.—A species of Hippeastrum from Peru was referred to the Scientific Committee by Floral Committee B, by whom an Award of Merit had been recommended. The species was not identifiable with any of which descriptions were available, though nearly related to H. pardinum.

February 20, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair,

and ten other members present.

Argyreia speciosa.-Mr. Baker reported that the leaves shown at the last meeting from Kenya belonged to the Indian Convolvulaceous plant Argyreia speciosa. The leaves of this plant are used as emollient poultices for wounds and externally in skin diseases in India.

Fasciated plants, etc.—Mr. Hosking showed fasciated shoots of Campanula rotundifolia, and two shoots of Black Bryony, Tamus communis, with, in each, a

pair of leaves opposite on the stem, the remainder being as normal—alternate.

Bulblets on Lily bulb.—Mr. Hosking also showed a bulb of Lilium Martagon with very numerous bulblets on the scales. The scales had evidently been injured, and wherever injury had occurred there was formation of bulblets, even when the injury was very small.

Wood Leopard in Rhododendron .- Mr. G. F. Wilson showed a branch of Rhododendron ponticum tunnelled by the caterpillars of the Wood Leopard Moth—the first occasion on which this pest had been recorded on this plant.

It is common on horse-chestnut and several other trees.

Sorbus Aria vars.-Mr. Fraser showed specimens of Sorbus Aria from Hindhead and from Reigate Hill, which he thought to belong to the variety longifolia, with oblong leaves; a specimen from Reigate Hill with obovate leaves and fruits about double the normal size; and one of var. cyclophylla, with almost rotund leaves, also from Reigate Hill. These specimens illustrated the enormous variability of the foliage of this species. (See p. x.)

Peat from Ulverston.—Dr. Tincker showed a sample of a peaty deposit from Ulverston composed entirely of the remains of a moss-apparently a species of

Hypnum—without mixture with Sphagnum.

Coeliopsis hyacinthosma.—Dr. Craven Moore of East Grinstead sent for exhibition the Panama orchid *Coeliopsis hyacinthosma* and it was referred by the Council to the Scientific Committee. The Committee recommended a Botanical Certificate (10 votes for) to this species, which had not been seen

in this country for a long period.

Galanthus from near Trebizond .- Mr. G. P. Baker showed a snowdrop collected by his brother from near Trebizond which showed all the characters of Galanthus latifolius save that the deep green foliage was narrow instead of broad. The species appears to vary greatly in the width of the leaf, and this appears to be an extreme form which has kept its character in cultivation. The Committee suggests that it is worthy a varietal name and that one indicating its source would be most appropriate.

Crocus veluchensis was also shown by Mr. Baker, who pointed out the likeness of the flowers generally to those of C. Sieberi, from which they differ in the lack of orange in the throat and in the relative narrowness of the perianth segments. Mr. Bowles commented upon the small size of the corm of this species, which

resulted in its being a poor garden plant compared with C. Sieberi.

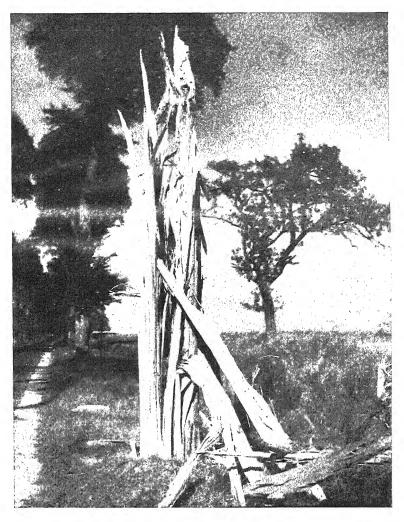


Fig. 115.—Wych Elm stem shattered by lightning at Abbeville.

FRUIT AND VEGETABLE COMMITTEE.

September 12, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and eleven other members present.

Award Recommended :-

Award of Merit.

To Plum 'Wierton Gage,' exhibited by Mr. W. H. Divers, Westdean, Hook,

near Surbiton (see p. 300).

Plum ' Delicious,' exhibited by Messrs. Laxton, Bedford, was recommended for inclusion in the Commercial Fruit Trials at Wisley. Other Exhibits.

Mr. E. A. Bunyard, F.L.S., Maidstone: Pear 'Monchallard,' a variety over one hundred years old.

Col. Speir, North Berwick: Apple from last meeting, with further particulars. Messrs. Laxton, Bedford: Plum 'Laxton's Delightful.'

Mr. A. E. Wheeler, Guildford: Seedling Apple 'Betty Wheeler.'

Mr. W. S. Cooper, Althorne: Seedling Apple.

Mr. R. B. Rogers, Launceston: West Country Apples 'White Essex,' 'Hollow Tree,' 'Lucombe Seedling,' 'Onion Redstreak,' and one unnamed.

Mr. R. Redden, Woodford Halse: Strawberry 'Royal Sovereign,' forced

plants fruiting a second time.

Commercial Fruit Trials, Wisley: Apples 'Arthur Turner,' 'Lord Lambourne,' 'Lord Rosebery,' 'Red Coat Grieve,' and 'Cutler Grieve.' Blackberry John Innes' and five varieties of Nuts.

September 27, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twenty other members present.

Award Recommended :-

Award of Merit.

To Plum 'Olympia,' exhibited by Messrs. Laxton, Bedford (see p. 300).

Other Exhibit.

Messrs. Laxton, Bedford: Plum 'Cropper.'

October 5, 1933, FRUIT AND VEGETABLE AUTUMN SHOW. Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Fogwills, Guildford: collection of Vegetables.

To University of Reading, Shinfield: collection of Fruit.

Silver-Gilt Hogg Medal.

To Major Berwick, Wantage: collection of Fruit.

To Messrs. Bunvard, Maidstone: collection of Fruit.

Silver Hogg Medal.

To Messrs. Laxton, Bedford: collection of Fruit.

To Messrs. Rivers, Sawbridgeworth: collection of Fruit and Pot Trees.

To Messrs. Waterer, Sons & Crisp, Twyford: collection of Fruit.

Silver Knightian Medal.

To Messrs. Sutton, Reading: Onions.

To Messrs. Dickson & Robinson, Manchester: Onions.

To Messrs. Carters, Raynes Park: Tomato 'Carter's Fruit.'

Hogg Medal.

To Messrs. Daniels, Norwich: collection of Fruit.

To Messrs. Cheal, Crawley: collection of Fruit.

To Messrs. Allgrove, Slough: collection of Fruit. To The Barnham Nurseries, Barnham: collection of Fruit.

To Studley Horticultural College, Warwick: collection of Fruit.

Bronze Knightian Medal.

To Cleypits Mushroom Farm, Thaxted: Mushrooms.

Award of Merit.

To Pear 'Sir Harry Veitch,' exhibited by Mr. J. C. Allgrove, Slough (see p. 300).

CXXII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Other Exhibits.

Messrs. Hopwood, Cheltenham: collection of Fruit.

Mr. A. L. Stock, Leicester: collection of Fruit.

Messrs. Brinkler, Osborne & Young, Brixton: Potatos.

Swanley Horticultural College, Swanley: Educational exhibit. Lady Thornycroft, Bembridge: Seedling Apple 'E. V. Lucas.

October 10, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and seven other members present.

The only business before the Committee concerned the identification of numerous fruits.

October 25, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fifteen other members present.

Exhibits.

The Hon. Henry McLaren, Bodnant, N. Wales: fresh and stewed fruits of Cydonia Wilsonii.

Mr. J. Loader, Bridlington: Apple 'Oxford Blue.'

Mr. A. Cox, New Zealand, near Calne: Apple 'New Zealand Beauty.' Studley Horticultural College, Warwick: Seedling Apple.
Mr. F. Jessop, Stoke: Apple 'Billy Boy.'

A collection of nine varieties of Quince, supplied by members of the Fruit and Vegetable Committee, East Malling Research Station, and R.H.S. Gardens, Wisley.

November 7, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and six other members present.

Exhibits.

Mr. E. H. Kemp, Watford: Seedling Apple.

New Milton Horticultural Association, Hants: Seedling Apple.

Mr. H. Goude, E. Dereham: Apple 'Norfolk Royal.'

Mr. W. Fordham, Dorking: Seedling Apple.

Messrs. Cheal, Crawley: Apple' Forge.
Mr. Courtney Page, 117 Victoria Street, S.W. 1: Seedling Apple.
Mr. J. J. Gibbons, Southampton: Apple—Scarlet sport of 'King of the Pippins.'

Commercial Fruit Trials, Wisley: Apples.

November 28, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fourteen other members present.

Award Recommended :-

Silver Hogg Medal.

To Messrs. Cheal, Crawley: collection of Apples.

Other Exhibit.

The Marquis of Exeter, Stamford: Apple 'Martin Cecil.'

December 12, 1933, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Exhibits.

Dr. H. S. Stone, Reigate: Seedling Apple.

Mr. J. M. Richards, Gatton Park Gardens: Pear for opinion.

January 9, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Awards Recommended :-

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading: Vegetables.

Hogg Medal.

To Messrs. Waterer, Sons & Crisp, Twyford: collection of Apples.

Other Exhibits.

Mr. A. B. Thorn, Ipswich: Seedling Apple.

Messrs. Cheal, Crawley: Apple 'Ruby

Viscountess St. Cyres, Lymington: Fruit of Actinidia chinensis.

January 23, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and thirteen other members present.

Award Recommended :-

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading: Potatos.

Other Exhibits.

L. F. C. Rich, Esq., Northwood: Pineapple 'Smooth Leaved Cayenne.'
Mr. E. A. Bunyard, Maidstone: Apples 'Brownlee's Russet,' 'Aromatic
Russet,' 'Golden Russet,' 'Old Royal Russet.'

Miss H. Halestrap, Upminster: seedling Apple. Commercial Fruit Trials, Wisley: Apples 'Crawley Beauty,' 'Eady's Magnum.

February 6, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fifteen other members present.

Award Recommended :-

Silver-gilt Knightian Medal.

To the Sussex Nurseries, Rustington: collection of Mushrooms.

Other Exhibits.

Messrs. Cheal, Crawley: collection of Apples. Mr. R. B. Rogers, Hexworthy: Seedling Apple. Mr. C. A. Fellows, Charlbury: Apple for opinion.

Mr. E. A. Bunyard, Maidstone: Apples 'Dutch Mignonne,' 'Beauty of Stoke' and 'Diamond Jubilee.'

February 20, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and sixteen other members present.

Award Recommended :-

Silver-gilt Hogg Medal.

To Messrs. Rivers, Sawbridgeworth, for Citrus fruits in pots and baskets. Other Exhibits.

Sussex Nurseries, Ltd., Rustington: Mushrooms, lettuce and tomatos.

Mr. N. Molyncux, Wickham: Seedling Apple.
Mr. T. C. Waite, Reading: Apple 'Whitley Beauty.'
Mr. K. M. Creadie, Manchester: Seedling Apple.

Mr. E. A. Bunyard, Allington: Apple 'Cox's Orange Pippin.'

FLORAL COMMITTEE A.

September 12, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. S. Ogg, Swanley, for Dahlias.

To Mr. J. B. Riding, Chingford, for Dahlias.

To Messrs. Waterer, Sons & Crisp, Twyford, for Dahlias.

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for Dahlias.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. Carter Page, London, for Dahlias.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Mr. J. T. West, Brentwood, for Dahlias.

To Messrs. Wheatcroft, Nottingham, for Roses, Asters and Phlox.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations. To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Godalming Nurseries, Godalming, for Dahlias.
To Messrs. Lawrence, Chatham, for Chrysanthemums.
To Mr. A. Miles, Bickley, for herbaceous plants.
To Mr. C. Turner, Slough, for Dahlias.
Selected for trial at Wisley.

Heliotrope 'Sudeley Blue' from Major J. H. Dent Brocklehurst, Winchcombe.

Other Exhibits.

Mr. T. Bones, Cheshunt: Michaelmas Daisies.

Mrs. E. Rogers Bull, Northampton: Michaelmas Daisies. Mr. T. Carlile, Twyford: herbaceous plants. Messrs. Clark, Dover: herbaceous plants.

Messrs. Gibson & Amos, Cranleigh: Dahlias.

Messrs. Rich & Cooling, Bath: herbaceous plants. Mr. H. Shoesmith, Jun., Woking: Chrysanthemums.

September 27, 1933, at Olympia, Mr. G. W. Leak, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :-

Award of Merit.

To Chrysanthemum 'Snowdonia' for cutting and market (votes unanimous), from Messrs. J. & T. Johnson, Tibshelf. See p. 302.

To Chrysanthemum 'Yellow Beauty' for cutting and market (votes unani-

mous), from Mr. T. Stevenson, Hillingdon. See p. 302.

To Rose 'Christopher Stone' (votes unanimous), from Mr. H. Robinson, Hinckley, See p. 307

Selected for trial at Wisley.

Salvia farinacea ' Blue Bedder ' from Messrs. Watkins & Simpson, London. Dianthus Allwoodii alpinus 'Mars' from Messrs. Allwood, Haywards Heath.

Messrs. Allwood, Haywards Heath: Carnation 'Ditchling' (to be seen again).

Messrs. B. R. Cant, Colchester: H. T. Rose 'Mildred' (to be seen again).

Mr. F. Horton, Sutton Coldfield: Chrysanthemums.

Mr. C. T. Kipping, Chelmsford: Chrysanthemum 'Mayland Yellow.'

Messrs. M. & D. Napier, Taunton: Pelargonium 'Mrs. Tom Darch.' Mr. H. Shoesmith, Jun., Woking: Chrysanthemums. Mr. H. Woolman, Birmingham: Chrysanthemums.

October 5, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and eight other members present.

Awards Recommended :-

Gold Medal.

To Mr. J. B. Riding, Chingford, for Dahlias.

Silver-gilt Banksian Medal.

To Mr. J. W. Forsyth, Putteridge, for Chrysanthemums. To Mr. S. Ogg, Swanley, for Dahlias.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

To Messrs. Cheal, Crawley, for Dahlias, etc.

To Mr. H. Hemsley, Crawley, for Dahlias.
To Messrs. Waterer, Sons & Crisp, Twyford, for Michaelmas Daisies, etc.
To Mr. W. Wells, Jun., Merstham, for Michaelmas Daisies.
To Messrs. Wood, Taplow, for Michaelmas Daisies.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations. To Messrs. Engelmann, Saffron Walden, for Carnations.

To Mr. A. Miles, Bickley, for Michaelmas Daisies, etc.

To Mr. A. Perry, Enfield, for Physostegia 'Vivid,' Nerines, etc.

Award of Merit.

To Aster novi-belgii 'Charles Wilson' for market and cutting (votes unanimous), from Messrs. Wood, Taplow. See p. 301.

Other Exhibits.

Messrs. Clark, Dover: herbaceous plants.

Messrs. Dickson & Robinson, Manchester: Dahlias.

Misses Hopkins, Coulsdon: hardy plants.

The West Byfleet Nursery, New Haw: Michaelmas Daisies.

October 10, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :-

Gold Medal.

To Mr. J. B. Riding, Chingford, for Dahlias. Silver-gilt Banksian Medal.

To Mr. S. Ogg, Swanley, for Dahlias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Barr, London, for Michaelmas Daisies, Nerines and Crocuses.

To Messrs. Cheal, Crawley, for Dahlias.
To Mr. J. W. Forsyth, Putteridge, for Chrysanthemums.
To Mr. E. Ladhams, Elstead, for herbaceous plants and shrubs.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

To Messrs. Prior, Colchester, for Roses.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

To Messrs. Wood, Taplow, for Michaelmas Daisies.

Banksian Medal.

To Messrs. Bentall, Havering, for Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Mr. J. F. Cumming, Wisbech, for Scabious.
To Messrs. Engelmann, Saffron Walden, for Carnations.
To Mr. H. Hemsley, Crawley, for Dahlias.

To Messrs. Lawrence, Chatham, for Chrysanthemums.

To Mr. A. Miles, Bickley, for Michaelmas Daisies, etc.

To Mr. J. T. West, Brentwood, for Dahlias.
To Mr. H. Woolman, Birmingham, for Chrysanthemums.
To Mr. W. Yandell, Maidenhead, for Chrysanthemums and Violas.

Award of Merit.

To Chrysanthemum 'Avondale Yellow' for cutting and market (votes 13 for),

from Messrs. Tyson, Crawley. See p. 302.
To Chrysanthemum 'Floodlight' for cutting and market (votes II for),

from Mr. J. Barrell, Bridgwater. See p. 302.

To Chrysanthemum 'Opale' for exhibition (votes unanimous), from Messrs.

Luxford, Sawbridgeworth. See p. 302.

Preliminary Commendation.

To Nerine 'Apache' as a greenhouse flowering plant (votes unanimous), from Lionel de Rothschild, Esq. (gr. Mr. A. Bedford), Exbury.

Other Exhibits.

Mr. L. Baldwin, Hockley: Chrysanthemum 'Golden Alcalde.'

Mr. W. Bennett, Burton-on-Trent: Chrysanthemum 'Ruddy Glow.'

Messrs. Clark, Dover: herbaceous plants.

Messrs. C. Elliott, Stevenage: Physostegias and Michaelmas Daisies. Messrs. J. & T. Johnson, Tibshelf: Chrysanthemum 'Snowmaiden.'

CXXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Mr. J. J. Kettle, Corfe Mullen: Violets.

Messrs. Pritchard, Christchurch: herbaceous plants.

Mr. E. Riley, Alfretton: Chrysanthemum 'Gladys.'
Mr. H. Shoesmith, Jun., Woking: Chrysanthemums.
The West Byfleet Nurseries, New Haw: Michaelmas Daisies.
Mcssrs. Walters, Bath: Aster Amellus 'Beauty of Kensington.'
Mr. H. Woolman, Birmingham: Chrysanthemums.

October 24, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Barr, London, for Dwarf Michaelmas Daisies, Nerines, etc.

To Messrs. Eveleens, Aalsmeer, Holland, for Cyclamen. To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

To Mr. S. Ogg, Swanley, for Dahlias. To Messrs. Prior, Colchester, for Roses.

To Mr. J. B. Riding, Chingford, for Dahlias.

To Messrs. Sutton, Reading, for Nemesias.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Colesbourne Gardens, Cheltenham, for Nerines.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Low, Enfield, for Carnations.

Award of Merit.

To Chrysanthemum 'Bar Gold' for cutting and market (votes unanimous),

from Mr. J. Barrell, Bridgwater. See p. 302.

To Chrysanthemum ' Joseph Bradford' for exhibition (votes unanimous), from Mr. H. Woolman, Birmingham. See p. 302.

To Chrysanthemum ' William Wigley' for exhibition (votes 13 for, 4 against), from Mr. H. Woolman, Birmingham. See p. 302.

Cultural Commendation.

To Mr. F. J. Bright, gardener to Captain H. G. Philpott, R.N., Cobham, Surrey, for a specimen plant of Chrysanthemum 'Mrs. R. Luxford.' Other Exhibits.

Mrs. Douglas Fraser, Banbury: 'Chrysanthemum' Liza Fraser.'

Mr. I. Godber, Willington: Chrysanthemum 'Mrs. I. Godber.

Dame Alice Godman, D.B.E., Horsham: Nerines.

Mr. H. Shoesmith, Jun., Woking: Chrysanthemums. Mr. A. W. Thorpe, Lichfield: Chrysanthemums.

A. Worsley, Esq., Isleworth: Nerine 'Attar.'

November 7, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Gold Medal.

To J. Pierpont Morgan, Esq. (gr. Mr. F. A. Steward), Aldenham, for Begonias. Silver-gilt Banksian Medal.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations. To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Low, Enfield, for Carnations.

To Mr. J. B. Riding, Chingford, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Graham Luxford' for exhibition (votes unanimous), from Messrs. Luxford, Sawbridgeworth. See p. 302.

Other Exhibits.

Misses Allen-Brown, Henfield: Violets.

Messrs. Engelmann, Saffron Walden: Carnation 'Giant Laddie' to be seen again.

Messrs. Greenyer, Worthing: Chrysanthemum 'Mary Mitchell.'

Messrs. Luxford, Sawbridgeworth: Chrysanthemum 'Smith's Superlative' to be seen again.

H. Vercesi, Esq., Islington: Chrysanthemum 'Golden East.'

November 28, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

Silver Banksian Medal.

To Hon. Mrs. C. Lambton (gr. Mr. A. R. Brumby), Mortimer, for Begonias. To Countess of Lytton (gr. Mr. W. H. Crocker), Knebworth, for pyramid cascade Chrysanthemums.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums. To Mr. H. Woolman, Birmingham, for Chrysanthemums.

To Lady Yule (gr. Mr. H. Ridcout), Bricket Wood, for Begonias.

Banksian Medal.

To Mr. N. C. Crone, Chingford, for Cyclamen.

To Messrs. Engelmann, Saffron Walden, for Carnations. To Mr. W. Yandell, Maidenhead, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Ina Cook' for cutting and market (votes unanimous),

from Mr. C. H. Cook, Windsor. See p. 302.

To Chrysanthemum 'Windsor Gold' for cutting and market (votes unanimous), from Mr. C. H. Cook, Windsor. See p. 302.

Other Exhibits.

Mr. J. J. Kettle, Corfe Mullen: Violets.

Dr. A. Palmer, Mortimer: Chrysanthemum 'Wokefield Nagoya.'

H. Vercesi, Esq., Islington: Chrysanthemum 'Golden East.

December 12, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums. To Mr. H. Woolman, Birmingham, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Marie de Petris' for cutting and market (votes II for), from Mr. T. Stevenson, Hillingdon. See p. 302.

To Chrysanthemum 'Peter John' for cutting and market (votes 10 for),

from Mr. T. Stevenson, Hillingdon. See p. 302.

To Chrysanthemum 'Santa Claus' for cutting and market (votes 9 for), from Messrs. Tyson, Crawley. See p. 302. Other Exhibits.

Messrs. Allwood, Haywards Heath: Carnation 'Allwood's Purity' (to be seen again).

J. Hanagan, Esq., Liverpool: Chrysanthemum 'Hanagan's Pink.' Lionel de Rothschild, Esq., Exbury: Nerine Manselli, F.C.C. 1887. Messrs. Smith, Kettering: Chrysanthemum 'Sir Henry Segrave.'

January 9, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Gerberas, Pansies, etc. Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Other Exhibits.

Messrs. Low, Enfield: Carnations 'Floris' and 'Phyllida.' Mr. A. G. Vinten, Balcombe: Chrysanthemum 'Maher's Xmas Red.'

January 23, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :— Gold Medal.

To Messrs. Blackmore & Langdon, Bath, for Cyclamen.

Silver Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc. To Messrs. Wakeley, London, for Hyacinths and other bulbous plants. CXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Selected for trial at Wisley.

Primula malacoides (double form), from Mrs. A. R. McMullen (gr. Mr. J. Underwood), Ware.

February 6, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Sutton, Reading, for Cyclamen.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Wakeley, London, for Hyacinths, Tulips and Daffodils.

Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Euphorbias, Pansies.

To Lady Hadden (gr. Mr. O. Hayles), Berkhamstead, for Primula 'Rossway Beauty.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Other Exhibit.

Misses Allen-Brown, Henfield: Violets.

February 20, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Carter, Raynes Park, for Primulas, Tulips and Crocusés.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Dobbie, Edinburgh, for Crocuses.

To Messrs. Sutton, Reading, for Primula malacoides in variety. Banksian Medal.

To Misses Allen-Brown, Henfield, for Violets.

To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc. To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Prins, Wisbech, for Hyacinths, Tulips and Daffodils. Selected for trial at Wisley.

Primula malacoides 'Lavender Queen' from L. Noël Sutton, Esq. (gr. Mr. F. Townsend), Reading.

The following plants received awards after trial at Wisley.

Award of Merit.

To Primula sinensis 'Dazzler 'from Messrs. Hurst, Houndsditch. See p. 306. Highly Commended.

To Primula malacoides 'Carmine Pink' from Mr. Dawkins, Chelsea. See p. 306.

Messrs. Sutton, Reading: Primula malacoides 'Parma Violet.'

Messrs. F. Woolman, Leicester: Chrysanthemum 'Edwin Seidewitz.'

FLORAL COMMITTEE B.

September 12, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Neale, Newhaven, for succulents.

Banksian Medal.

To Messrs. Russell, Richmond, for stove plants.

Award of Merit.

To Caryopteris × clandonensis as a hardy flowering shrub (votes 14 for), from A. Simmonds, Esq., West Clandon (p. 301).

To Eucryphia Moorei as a tender flowering shrub (votes 9 for), from the Hon.

Henry McLaren, Bodnant (p. 304).

To Indigofera decora as a hardy flowering plant (votes 14 for), from C. T. Musgrave, Esq., Hascombe (p. 305).

Cultural Commendation.

To Major A. Pam, Broxbourne, for flowering sprays of Lagerstroemia indica. Other Exhibits.

Mrs. Bernard, Wimborne: Ligustrum lucidum.

Messrs. Bunyard, Maidstone: fruits of Rosa species. Sir Wm. Lawrence, Bt., Burford: Rhodostachys bicolor. Mrs. Robert Lukin, Burghfield Common: Sedum sp.

Major A. Pam, Broxbourne: Alstroemeria campaniflora. Messrs. Russell, Richmond: Rhododendron javanicum.

September 27, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twentytwo other members present.

Awards Recommended :--

Award of Merit.

To Colchicum speciosum var. atro-rubens as a hardy flowering plant (votes unanimous), from R. D. Trotter, Esq., Ockley (p. 302).

To Crataegus orientalis as a hardy ornamental-fruiting tree (votes 17 for),

from Viscountess St. Cyres, Lymington (p. 303).

To Elaeagnus umbellata as a hardy ornamental-fruiting shrub (votes 11 for, 2 against), from Viscountess Byng of Vimy, Thorpe-le-Soken (p. 304).

To Eriogonum niveum as a hardy flowering plant (votes 18 for), from T. Hay,

Esq., Hyde Park, London (p. 304).

To Hypericum elatum, Elstead form, as a hardy ornamental-fruiting shrub (votes 14 for), from Mr. E. Ladhams, Elstead (p. 305).

Preliminary Commendation.

To Acer sp. (Forrest Expedition, 1930-1932) (votes 14 for, 1 against), from Sir Stephenson Kent, K.C.B., Nutley.

To Liabum bullatum (votes 8 for), from Sir Stephenson Kent, K.C.B., Nutley.

Other Exhibits.

F. R. S. Balfour, Esq., Stobo: Lonicera Xylosteum forma.

Messrs. Bees, Chester: Gynerium argenteum elegans.

Viscountess Byng of Vimy, Thorpe-le-Soken: Pittosporum Tobira.

F. Hanbury, Esq., East Grinstead: Hoheria populnea, Myrtus communis var. tarentina.

Capt. H. G. Hawker, Ermington: Hedychium acuminatum. T. Hay, Esq., Hyde Park: Scabiosa Fischeri. Sir Stephenson Kent, K.C.B., Nutley: Solanum sp., Lupinus sp., Caiaphora scarlatina.

G. W. E. Loder, Esq., Ardingly: Evodia velutina, Hymcnanthera crassifolia. The Hon. Henry McLaren, Bodnant: Gaultheria sp.

R. L. Newman, Esq., Dartmouth: Colletia cruciata, C. spinosa rosea, Tithonia speciosa.

Mr. Amos Perry, Enfield: Colchicum cilicicum atropurpureum, Physalis Franchetii nana, Cupressus pisifera argentea.

The Director, R.H.S. Gardens, Wisley: fruit of Akebia quinata. Messrs. Simmonds, Kings Langley: Cotoneaster frigida pendula. Viscountess St. Cyres, Lymington: Eucryphia Moorei.

October 5, 1933, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and ten other members present.

Award Recommended :-

Banksian Medal.

To Mr. T. M. Endean, Laindon, for succulents.

Other Exhibits.

Mr. Amos Perry, Enfield: Zephyranthes sp. Messrs. T. Yano, London: Dwarf Conifers.

October 10, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:

Silver Banksian Medal.

To Mr. T. M. Endean, Laindon, for Mesembryanthemums.

Banksian Medal.

To Messrs. Stewart, Ferndown, for shrubs.

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Award of Merit.

To Cotoneaster conspicua as a hardy, ornamental fruiting shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 303.

To Polygonum lichiangense as a hardy flowering plant (votes 12 for), from T. Hay, Esq., Hyde Park. See p. 306.

Other Exhibits.

W. H. B. Fletcher, Esq., Bognor: Amaryllis Belladonna × Nerine Bowdenii. The Misses Hopkins, Coulsdon: hardy plants.

I.t.-Col. Messel, Handcross: Pernettya leucocarpa.

R. L. Newman, Esq., Dartmouth: Banksia marginata, Melaleuca hypericifolia, Colquhounia vestita.

Messrs. Russell, Richmond: Clematis and Vitis spp.

R. D. Trotter, Esq., Ockley: Cotoneasters.

October 24, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Gold Medal.

To Lionel de Rothschild, Esq., Exbury, for shrubs.

Silver-gilt Banksian Medal.

To Messrs. L. R. Russell, Richmond, for stove plants.

To Messrs. Waterer, Bagshot, for shrubs.

Silver Lindley Medal.

To the Hon. Mrs. Ryder, Beaulieu, for Proteas and other tender shrubs.

Silver Banksian Medal.

To the Dowager Countess Cawdor, Haslemere, for shrubs.

To Messrs. Cheal, Crawley, for shrubs. To Mr. T. M. Endean, Laindon, for succulents.

To Messrs. Hillier, Winchester, for shrubs.

To Mr. E. Ladhams, Elstead, for shrubs and herbaceous plants.

To Messrs. Neale, Newhaven, for Gazanias and succulents.

Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for alpine and bulbous plants.

To Viscountess St. Cyres, Lymington, for shrubs.

To Messrs. Wm. Wood, Taplow, for shrubs.

Award of Merit.

To Cassia corymbosa as a hardy flowering shrub (votes 10 for, 5 against), from Sir Wm. Lawrence, Bt., Burford. See p. 301.

To Iberis linifolia as a hardy flowering plant (votes unanimous), from Mrs.

Torkington, Maidenhead. See p. 305.

To Sambucus velutina as a hardy ornamental-fruiting shrub (votes 10 for, 4 against), from Viscountess Byng of Vimy, Thorpe-le-Soken. See p. 307.

Preliminary Commendation.

To Calluna vulgaris elegantissima as a hardy flowering shrub (votes unanimous), from Mr. W. E. Th. Ingwerson, East Grinstead.

Cultural Commendation.

To Mr. C. Savegar, gardener to Dame Alice Godman, D.B.E., Horsham, for a specimen plant of Leonotis Leonurus.

To Mr. F. C. Puddle, gardener to the Hon. Henry McLaren, Bodnant, for a flowering branch of Banksia collina.

To C. T. Musgrave, Esq., Hascombe, for Gentiana trichotoma.

Other Exhibits.

Chez Nous Nurseries, Newick: Conifers. University Botanic Gardens, Cambridge: Clerodendron Fargesii.

Messrs. Clark, Dover: shrubs and herbaceous plants.
Dame Alice Godman, D.B.E., Horsham: Gerbera Jamesonii.

W. Balfour Gourlay, Esq., Cambridge: Echinops sp. Misses Hopkins, Coulsdon: hardy plants.

Knap Hill Nursery Co., Woking: shrubs.

Mrs. Aubrey Trevor Lawrence, Frensham: Vitis heterophylla.

The Hon. Henry McLaren, Bodnant: Colletia cruciata.

Lt.-Col. Messel, Handcross: Cotoneaster frigida microcarpa, C. rotundifolia. Mrs. H. Milford, Chedworth: shrubs and succulents. Broadlands Home, Newport, I.O.W.: fruits of Punica Granatum.

Mr. Amos Perry, Enfield: Physalis Franchetii nana.

Viscountess St. Cyres, Lymington: Olearia Forsteri.

Mrs. Torkington, Maidenhead: fruits of Punica Granatum.

Messrs. Waterer, Bagshot: Callicarpa Giraldiana.
A. Worsley, Esq., Isleworth: Nerine Bowdenii, N. flexuosa alba, N. corusca major.

November 7, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for shrubs. To Messrs Neale, Newhaven, for succulents.

Banksian Medal.

To Messrs. Wm. Wood, Taplow, for shrubs.

First-class Certificate.

To Arbutus Unedo as a hardy evergreen flowering and fruiting tree (votes 13 or), from Viscountess St. Cyres, Lymington. See p. 301.

Award of Merit.

To Danae racemosa as a hardy evergreen fruiting shrub (votes unanimous), from Viscountess St. Cyres, Lymington. See p. 304. Other Exhibits.

Hiatt C. Baker, Esq., Almondsbury: Euonymus grandiflorus, Globularia

Alypum.
Messrs. Clark, Dover: shrubs.

T. Hay, Esq., Hyde Park: Lilium Catesbaei.

Hocker Edge Gardens, Cranbrook: alpine plants and Crocus species.

Misses Hopkins, Coulsdon: rock plants.

Edward Howarth, Esq., Wirdford: Colletia infausta.

G. W. E. Loder, Esq., Ardingly: Lonicera nitida var. yunnanensis. Lt.-Col. L. C. R. Messel, Handcross: Skimmia japonica var. 'Nymans.'

Messrs. Russell, Richmond: shrubs.

Viscountess St. Cyres, Lymington: Osmanthus ilicifolia, Myrtus Ugni, Elaeagnus macrophylla.

November 28, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Mr. Amos Perry, Enfield, for hardy ferns.

To Messrs. L. R. Russell, Richmond, for Crotons.

Banksian Medal.

To Messrs. Hemsley, Crawley, for shrubs.

Award of Merit.

To Cotoneaster 'Cornubia' as a hardy ornamental-fruiting shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 303.

To Gaultheria codonantha as a flowering shrub for the cool house (votes 10 for),

from Lionel de Rothschild, Esq., Exbury. See p. 304.

To Lachenalia pendula as a flowering plant for the cool house (votes unanimous), from the Director, John Innes Horticultural Institution, Merton. See

To Malus x zumi as a hardy ornamental-fruiting shrub (votes 9 for), from Lionel de Rothschild, Esq., Exbury. The award was recommended on September 12, 1933, subject to revision of name. See p. 305.

Other Exhibits.

Mr. Edwin Beckett, Radlett: Malus 'Gibbs' Golden Gage.'

Admiral A. W. Heneage-Vivian, Swansea: shrubs.

Mrs. Robert Lukin, Burghfield Common: Ranunculus calandrinioides, Centaurea sp.

The National Rose Society, Haywards Heath: Rosa × earlhamensis.

December 12, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. W. T. & H. E. Neale, Newhaven, for succulents.

Banksian Medal.

To Mr. T. M. Endean, Laindon, for succulents. To W. G. Theobald, Esq., Steyning, for succulents.

To Mr. Amos Perry, Enfield, for hardy ferns.

Other Exhibits.

Mr. T. M. Endean, Laindon: Trichodiadema stellatum.

E. J. P. Magor, Esq., St. Tudy: Athrotaxis selaginoides. Miss K. A. Ricardo, Wimborne: Berberis Wilsonae seedling.

L. de Rothschild, Esq., Exbury: Crataegus Carrierei.

CXXXII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

January 9, 1934, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :-

Silver-gilt Lindley Medal.

To the Australian Nature Travel Association, Trafalgar Square, London, for an exhibit of Australian flowers preserved in ice.

Cultural Commendation.

To Mr. A. Bedford, gardener to Lionel de Rothschild, Esq., Exbury, for very large fruiting sprays of Callicarpa rubella.

Other Exhibits.

Messrs. Barr & Son, Covent Garden: alpine and bulbous plants.

Messrs. Cheal & Son, Crawley: shrubs.

Messrs. Stuart Low & Co., Enfield: stove plants and shrubs.

Dr. A. Q. Wells, Great Missenden: Adonis amurensis.

January 23, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :---

Banksian Medal.

To Messrs. Barr & Son, Covent Garden, for bulbous plants.

To Messrs. Hemsley, Crawley, for evergreen shrubs.

To Hocker Edge Gardens, Cranbrook, for bulbous plants.

To Messrs. Neale, Newhaven, for succulents.

To Messrs. Stewart, Ferndown, for bulbous plants and shrubs.

Award of Merit.

To Acacia alata as a flowering shrub for the temperate house (votes unanimous), from the Director, R.H.S. Gardens, Wisley. See p. 300.

To Crassula lactea as a flowering plant for the cool house (votes 7 for), from Mr. T. M. Endean, Laindon. See p. 303.

Other Exhibits.

Messrs. Allen, Newick: alpine and bulbous plants.

The Australian Nature Travel Association, London: Australian flowers preserved in ice.

Messrs. Baker, Codsall: alpine plants and shrubs. Messrs. Cheal, Crawley: shrubs. Messrs. Clark, Dover: shrubs.

Mr. T. M. Endean, Laindon: succulents. Messrs. Engelmann, Saffron Walden: Echeveria gibbiflora.

W. Balfour Gourlay, Esq., Cambridge: Galanthus latifolius.

Misses Hopkins, Coulsdon: rock plants. The Rev. Rollo Meyer, Hertford: bulbous Irises.

Messrs. Russell, Ltd., Richmond: flowering shrubs.

Messrs. Waterer, Sons & Crisp, Twyford: shrubs and bulbous plants. Colonel Sir Clive Wigram, St. James's Palace: Daphne cannabina.

The Director, R.H.S. Gardens, Wisley: Buddleia madagascarensis.

February 6, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for Hellebores and Narcissi.

To Hocker Edge Gardens, Cranbrook, for alpine and bulbous plants.

Banksian Medal.

To Dartington Hall, Ltd., Totnes, for alpine plants.

To Messrs. Hillier, Winchester, for shrubs.

To Messrs. Prichard, Christchurch, for Saxifrages in pans.

To Messrs. Russell, Richmond, for flowering shrubs.

To Messrs. Stewart, Ferndown, for shrubs and bulbous plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for alpine and bulbous plants.

To Messrs. Wm. Wood, Taplow, for alpine and bulbous plants.

Award of Merit.

To Camellia japonica var. 'Kimberley' as a hardy flowering shrub (votes unanimous), from the Director, Royal Botanic Gardens, Kew. See p. 301.

To Crocus Olivieri as a hardy flowering plant for the rock garden and alpine house (votes unanimous), from Colonel C. H. Grey, Hocker Edge Gardens, Cranbrook. See p. 303.

To Rosa multiflora 'Lady Grey's Variety' as a hardy flowering shrub (votes 8 for), from the Countess Grey, Alnwick. See p. 307.

This award was recommended on July 18, 1933, subject to naming, and is now confirmed.

Other Exhibits.

Messrs. Allen, Newick: alpine and bulbous plants.

Alpine Nurseries, West Moors: alpine and bulbous plants.

G. P. Baker, Esq., Sevenoaks: Helleborus Kochii. Messrs. Baker, Codsall: alpine plants and shrubs.

Messrs. Cheal, Crawley: alpine plants and shrubs.

Mr. T. M. Endean, Laindon: succulents. Messrs. Engelmann, Saffron Walden: Echeveria gibbiflora, E. retusa.

Misses Hopkins, Coulsdon: rock plants.

Mrs. R. S. Milford, Chedworth: alpine plants.

Messrs. Prichard, Christchurch: Saxifraga megaseaeflora 'Mrs. Harry Lindsay.'

Messrs. Reuthe, Keston: shrubs.

February 20, 1934, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for Narcissi and other bulbous plants.

To Brookside Nurseries, Oxford, for Saxifrages in pans.

To Messrs. Casburn, Bedford & Page, Cambridge, for Saxifrages in pans.

To Hocker Edge Gardens, Cranbrook, for Crocuses, Irises and other bulbous plants.

To Messrs. Neale, Newhaven, for succulents. To Messrs. R. Veitch, Exeter, for Magnolias and Heaths. To Mr. G. G. Whitelegg, Chislehurst, for dwarf Conifers.

Banksian Medal.

To Messrs. Cheal, Crawley, for alpine plants and shrubs.
To Dartington Hall, Ltd., Totnes, for alpine plants in pans.

To Mr. T. M. Endean, Laindon, for succulents.

To Messrs. Hillier, Winchester, for Conifers and flowering shrubs.

To Messrs. Prichard, Christchurch, for Saxifrages in pans. To Messrs. Reuthe, Keston, for shrubs. To Messrs. Russell, Richmond, for flowering shrubs.

To Messrs. Stewart, Ferndown, for shrubs and bulbous plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for alpine and bulbous plants.

To Messrs. Wm. Wood, Taplow, for alpine and bulbous plants.

Other Exhibits.

Messrs. Allen, Newick: Conifers and alpine plants.

Alpine Nurseries, West Moors: alpine plants and shrubs. G. P. Baker, Esq., Sevenoaks: Crocus veluchensis, Galanthus latifolius var.

Messrs. Baker, Codsall: shrubs and alpine plants.

Messrs. Clark, Dover: shrubs.

Messrs. Fisher, Son & Sibray, Sheffield: Berberis Aquifolium var.

Misses Hopkins, Coulsdon: rock plants. Messrs. Stuart Low, Enfield: Daphne odora.

Messrs. Redgrove & Patrick, Sevenoaks: Conifers.

Lionel de Rothschild, Esq., Exbury: Jasminum nudiflorum var. Sieboldianum.
C. R. Scrase-Dickins, Esq., Horsham: Helleborus niger Bath Variety.
Swanley Horticultural College, Swanley: Echeveria retusa.

Mr. G. E. Welch, Cambridge: alpine plants in pans.

JOINT DAHLIA COMMITTEE.

August 1, 1933, Mr. G. W. LEAK, V.M.H., in the Chair, and six other members present.

To be seen again.

From Messrs. Redgrove & Patrick, Seal: 'Bonny Boy' (Bedding).

Dahlias were also submitted by Sir William Lawrence, Bt.

August 15, 1933, Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

Selected for trial at Wisley.

From Mr. J. F. Barwise, Burnley: 'General Scarlet' (Dec.), 'Golden Nugget' (Small Dec.), 'Towneley Cheer' (Small Pæony-flowered).

From Mr. J. B. Riding, Chingford: 'Isabel McElroy' (Dec.).

From Messrs. Stredwick, St. Leonards-on-Sea: 'C. C. Messervy' (Dec.), 'Freebooter' (Cactus), 'Kiwi' (Small Dec.), 'Pylon' (Semi-Cactus), 'Rev. Geo. Garner ' (Dec.).

Dahlias were also submitted by the following:

Messrs. Ballego, Leiden.

August 29, 1933, Mr. C. T. Musgrave, V.M.H., in the Chair, and twelve other members present.

Selected for trial at Wisley.

From Messrs. Ballego, Leiden: 'Leiden's Elegance.'

From Messrs. Bailego, Leiden: 'Leiden's Elegance.'
From Messrs. Buckwell, St. Mary Cray: 'Red King' (Dec.).
From Messrs. Stredwick, St. Leonards-on-Sea: 'Armada' (Dec.), 'Ed. Z.
Barnes' (Dec.), 'Major Churcher' (Small Dec.), 'Merriment' (Dec.), 'Mrs. A.
Fiedler' (Cactus), 'Phœbe Bryant' (Dec.), 'Postman' (Dec.), 'R. P. Rutherford' (Dec.), 'Volcano' (Dec.), 'Wasp' (Small Dec.), 'White Owl' (Dec.).
From Messrs. Treseder, Cardiff: 'Torquay Gem' (Small Dec.).
Dablias were also submitted by the following:

Dahlias were also submitted by the following:

A. J. Cobb, Esq., Reading; G. F. Drayson, Esq., Buckhurst Hill; J. B. Pearman, Esq., Warnham.

September 5, 1933, Mr. D. B. CRANE in the Chair, and seven other members present.

Selected for trial at Wisley.

From Mr. A. J. Barwise, Burnley: 'Calder' (Small Dec.).

From Messrs. Burrell, Cambridge: 'Glyn' (Medium Dec.), 'Mattie' (Small Dec.), 'Rubric' (Small Dec.).

From Messrs. Cheal, Crawley: 'Trevor' (Medium Dec.).
From C. A. Hay, Esq., Hindhead: 'Windibank' (Small Dec.).
From Messrs. Nagels, Antwerp: 'Nagels' Glory' (Large Dec.), 'Madame F.
Good' (Large Dec.), 'Miss Belgium' (Cactus), 'Tunnel Anversois' (Large Dec.).
From Mrs. Courtney Page, Haywards Heath: 'Pink Rose' (Small Pæony-

From Mr. J. T. West, Brentwood: 'Baby Princess' (Small Dec.), 'Friars Craig' (Medium Dec.), 'Little Love' (Small Dec.).

Dahlias were also submitted by the following:

Mr. O. Chennell, Horsham; Mr. A. Goddard, Windrush; Mr. H. Hodge,
Wimbledon; Messrs. Jarman, Chard; Miss I. Marshall, Hythe; Mr. A. F.
Oliver, Merrow; Mr. S. Ogg, Swanley; Messrs. Carter Page, London; Mr. R. P.
Rutherford, Heswall; Mr. A. Sotheby, Guildford; Messrs. Stredwick, St. Leonards-on-Sea; Messrs. Treseder, Cardiff; Mr. H. Woolman, Birmingham.

September 12, 1933, Mr. D. B. CRANE in the Chair, and seven other members present.

Selected for trial at Wisley.

From A. J. Cobb, Esq., Reading: 'Georgette' (Single). From Messrs. Carter Page, London: 'Honey' (Pompon). From Mr. J. B. Riding, Chingford: 'Shintenshi' (Cactus).

From Messrs. Stredwick, St. Leonards-on-Sea: 'Dora' (Small Dec.), 'Ermine' (Pompon), 'Harvester' (Semi-Cactus), 'Jack Pyman' (Large Dec.), 'Wheatear' (Small Dec.).

From Mr. J. T. West, Brentwood: 'Covent Garden' (Small Dec.), 'Ethel Harrild' (Small Cactus), 'Winnie Cornhill' (Small Cactus).

Dahlias were also submitted by the following:

Messrs. Brown & Such, Maidenhead; Messrs. Buckwell, St. Mary Cray; Messrs. Burrell, Cambridge; Sir William Lawrence, Bt., Dorking; G. P. Roddam, Esq., Tunbridge Wells.

September 27, 1933, Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

Selected for trial at Wisley.

From Messrs. Cheal, Crawley: 'Sceptre' (Medium Dec.), 'Worthing Star' (Star).

From A. J. Cobb, Esq., Reading: 'Bronze Witch' (Single), 'Gwilym White' (Medium Pæony-flowered).

From Mr. G. Elsom, Spalding: 'Constance' (Small Dec.), 'Purity' (Small Dec.).

From Messrs. Sandford, Mildenhall: 'Pink Daily Mail' (Large Dec.).
From Mr. J. T. West, Brentwood: 'Dawn O'Day' (Cactus), 'I
Emberson' (Small Dec.), 'Sonny' (Small Cactus), 'Tots' (Small Dec.). Marjorie

Dahlias were also submitted by the following:

Mr. J. T. McGaw, Horsham; Messrs. Rowlands, Liverpool; R. P. Rutherford, Esq., Birkenhead; Mr. H. Shoesmith, Jun., Woking; Messrs. Treseder, Cardiff.

October 5, 1933, Mr. T. HAY, V.M.H., in the Chair, and six other members present.

Selected for trial at Wisley.

From Messrs. Cheal, Crawley: 'Iraq' (Single).

Dahlias were also submitted by the following:
G. B. Bernard, Esq., Hockley; A. J. Cobb, Esq., Reading.

ORCHID COMMITTEE.

August 29, 1933, Mr. F. J. HANBURY in the Chair, and six other members present.

No awards were recommended on this occasion.

Messrs. Charlesworth, Haywards Heath, exhibited several interesting hybrids.

September 12, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and three other members present.

Award Recommended :-

Award of Merit.

To Vuylstekeara x 'Averna' (votes unanimous), from Messrs. Charlesworth (see p. 307).

Cultural Commendation.

To Mr. J. Band, Orchid-grower to F. Mercer, Esq., Steyning, for Epidendrum prismatocarpum, with a dozen erect flower-spikes.

Other Exhibits.

Messrs. Stuart Low, Jarvis Brook: various species and hybrids. Messrs. Charlesworth, Haywards Heath: Cattleya Dowiana aurea. Messrs. J. & A. McBean, Cooksbridge: Laeliocatileya 'Servino.'

F. Mercer, Esq., Steyning: Miltonia x 'Myrna.'

September 27, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and nineteen other members present.

Awards Recommended :-

First-class Certificate.

To Cypripedium × 'F. C. Puddle,' Bodnant var. (votes 16 for, 3 against), from the Hon. H. D. McLaren. Flower of thick texture, well formed and porcelain-white (see p. 304). Award of Merit.

To Brassolaeliocattleya x 'Rotherfield' (votes unanimous), from Messrs.

Stuart Low (see p. 301).

To Laeliocattleya × 'Berenice' var. 'Crimson Glory' (votes unanimous), from Messrs. H. G. Alexander, Tetbury (see p. 305).

Other Exhibits.

Frank Mercer, Esq., Steyning: Miltonia × 'Sybilla.'

Messrs. McBean, Cooksbridge: Brassocattleya x 'Marie-Marie.

October 10, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and nine other members present.

Awards Recommended :-

Award of Merit.

To Lachiocattleya x 'Princess Margaret' var. 'Perfection' (votes unanimous),

from Messrs. McHean (see p. 305).

To Brassocattleya × 'Marie-Marie' var. superba (votes 6 for, 1 against), from Mrs. R. Paterson (see p. 301).

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Zygopetalum Gautieri, with thirteen spikes bearing fifty flowers.

Other Exhibits.

Messrs. Charlesworth, Haywards Heath: various Orchids.

Messrs. Stuart Low, Jarvis Brook: Cattleya hybrids.

October 24, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty other members present.

Awards Recommended :-

Gold Medal.

To Mrs. Paterson, Ardingly, for a group.

To F. J. Hanbury, Esq., East Grinstead, for a group.

To Messrs. Black & Flory, Slough, for a group.

Silver-gilt Banksian Medal.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

Silver Banksian Medal.

To Sir Jeremiah Colman, Bt., Gatton Park, Surrey, for a group.

To Messrs. McBean, Cooksbridge, for a group.

To Messrs. H. G. Alexander, Tetbury, for a group. To Messrs. Armstrong & Brown, Tunbridge Wells, for a group. Banksian Medal.

To Messrs. Harry Dixon, Wandsworth Common, for a group.

First-class Certificate.

To Lacliocattleya × 'Princess Margaret' var. magnifica (L.-c. × 'Profusion' × C. × 'Clotho') (votes unanimous), from Messrs. McBean (see p. 305).

Award of Merit.

To Vuylstekeara × 'Estella Jewell' var. 'Ruby' (Miltonia × 'Wm. Pitt' × Vuylsteheara × 'Aspasia') (votes 17 for), from Messrs. Charlesworth (see p. 307).
 To Sophrolaeliocatileya × 'Albalva' Stonehurst var. (C. × Hardyana × S.-l.-c. × 'Isabella') (votes 12 for, 2 against), from Mrs. Paterson (see p. 307).

November 7, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and fourteen other members present.

Awards Recommended :-

Award of Merit.

To Odonioglossum × 'Eudora,' Clovelly var. ('Dictune' × 'Serapis') (votes unanimous), from F. Mercer, Esq., Steyning, Sussex (see p. 306).

To Brassocattleya × 'Corona' (C. × 'Corona' × B.-c. × 'Ruby') (votes

10 for, 4 against). from Messrs. Black & Flory, Slough (see p. 301).

Cultural Commendation. To Messrs. Armstrong & Brown, for Selenipedium × grande macrochilum (votes unanimous), with three spikes and a total of nine flowers.

Vote of Thanks.

To Messrs. Sanders, St. Albans, for a group. To Messrs. Black & Flory, Slough, for a group.

To Messrs. Charlesworth, Haywards Heath, for a group.

To F. J. Hanbury, Esq., East Grinstead, for various Orchids. To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. McBean, Cooksbridge, for various Orchids.

November 28, 1933, Sir JEREMIAH COLMAN, Bt., in the Chair, and sixteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Lionel de Rothschild, Esq., Exbury, for Cypripediums.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Black & Flory, Slough, for a group. To Messrs. Charlesworth, Haywards Heath, for a group. Banksian Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

To Messrs. Stuart Low. Jarvis Brook, for a group. To Messrs. H. G. Alexander, Tetbury, for a group.

First-class Certificate.

To Odontioda × 'Minos' var. 'Margaret' (Oda. × 'Lerna' × Odm. × 'Cardinale') (votes unanimous), from L. Wells, Esq., Chiddingfold, Surrey (see p. 306).

Award of Merit.

Award of Merit.

To Miltonia × 'Bleuarm' (Bleuana × 'T. B. Armstrong') (votes 10 for, 5 against), from Mrs. Robert Paterson, Ardingly (see p. 305).

To Cypripedium × 'Ambition' var. 'Regina' ('Gwen Hannen' × Fairrieanum) (votes 15 for), from Lionel de Rothschild, Esq., Exbury (see p. 303).

To Cypripedium × 'Balbus' ('Virgil' × 'Hancar') (votes 14 for, 1 against), from Lionel de Rothschild, Esq., Exbury (see p. 304).

Cultural Commendation.

To Mr. Pryce, Orchid-grower to Alan Gibbs, Esq., Tanglewood, Lisvane, Glam., for Cymbidium x 'Orion' var. 'Dawn.

To Mr. Field, Orchid-grower to Miss H. N. Freshfield, Wych Cross Place, Forest Row, Sussex, for Calanthe × Sedenii var. Harrisii.

January 9, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and nineteen other members present.

Awards Recommended :--

Gold Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Cypripediums.

To Messrs. H. G. Alexander, Tetbury, for Cypripediums. To Sir William Cooke. Hampstead Novice for Confession of Co

CXXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

Silver-gilt Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for Orchids.

Silver Banksian Medal.

To Messrs. Black & Flory, Slough, for Cypripediums.
To G. P. Harben, Esq., King's Somborne, for Cypripediums.
To Messrs. Stuart Low, Jarvis Brook, Sussex, for Orchids.
To Messrs. Sanders, St. Albans, for Orchids.

To Sir Jeremiah Colman, Bt., Gatton Park, for Cypripediums.

First-class Certificate.

To Cypripedium × 'Beersheba' ('Gwen Hannen' × 'Chardmoore') (votes 16 for), from Lionel de Rothschild, Esq. (see p. 304).

To Calanthe × 'Hexham Gem' var. 'Mickley' ('Angela' × 'Bryan')

(votes 12 for, 5 against), from Clive Cookson, Esq., Hexham (see p. 301).

Award of Merit.

To Calanthe x 'Hexham Gem' var. 'The Abbey' ('Angela' x 'Bryan') (votes 18 for), from Clive Cookson, Esq. (see p. 301).

To Calanthe x 'Hexham Gem' var. 'Dipton' ('Angela' x 'Bryan')

(votes 16 for), from Clive Cookson, Esq. (see p. 301).

To Millonia × 'Orissa' var.' Crimson King' (Bleuana × 'Beau Brummell') (unanimous), from Mrs. Robert Paterson (see p. 306).

To Vuylstekeara × 'Agatha' (V. 'Memoria Joseph Charlesworth' × O.

'Imperator') (votes 12 for, 4 against), from Messrs. Charlesworth (see p. 307). Cultural Commendation.

To Mr. W. J. Stables, Orchid-grower to Clive Cookson, Esq., Hexham, for Calanthe × 'Hexham Gem' var. 'Flamingo.'

Vote of Thanks.

To Mr. D. A. Cowan, Surbiton, for Orchids.

To Messrs. McBean, Cooksbridge, for Orchids.

To Messrs. Keeling, Bradford, for Cypripediums.

To Dr. F. Craven Moore, East Grinstead, for Cypripediums.

To Messrs. Dixon, Wandsworth Common, for Orchids.

January 23, 1934, F. J. HANBURY, Esq., in the Chair, and sixteen other members present.

Awards Recommended :-

Gold Medul.

To Dr. F. Craven Moore, Duckyls, East Grinstead, for Cypripediums. Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

To T. O. Stevens Perry, Esq., Hartland, West Byfleet, for a group.

Award of Merit.

To Miltonia × 'Christine' ('Gertrude West' × 'Lycaena') (votes 15 for). from Messrs. Black & Flory, Slough (see p. 3c6).

To Cypripedium x 'Sheba' (parentage unknown) (unanimous), from F. J.

Hanbury, Esq., Brockhurst, East Grinstead (see p. 304).

Vote of Thanks.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

To Major P. Pechell, Odiham, Hampshire, for a group.

To Messrs. H. G. Alexander, Tetbury, for a group.

To Messrs. A. J. Keeling, Bradford, for Cypripediums.

To Baron Schröder, Englefield Green, for Cypripediums.

To Messrs. Black & Flory, Slough, for a group.

February 6, 1934, F. J. HANBURY, Esq., in the Chair, and fourteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

First-class Certificate.

To Odontoglossum crispum var. 'Conchita' (votes 10 for, 2 against), from Messrs. Charlesworth, Haywards Heath (see p. 306).

Award of Merit.

To Cymbidium × 'Charmion' (erythrostylum × 'Flamingo') (votes 11 for), from E. Kenneth Wilson, Esq., Cannizaro, Wimbledon (see p. 303).

To Odontoglossum × mirum var. 'Canary' (crispum × Wilcheanum) (votes

unanimous), from Messrs. McBean, Cooksbridge, Sussex (see p. 306). Vote of Thanks.

To Messrs. D. A. Cowan, Surbiton, for a group.

To Messrs. McBean, Cooksbridge, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group. To Messrs. H. G. Alexander, Tetbury, for a group. To Messrs. Black & Flory, Slough, for a group.

Other Exhibits.

Lionel de Rothschild, Esq., Exbury: *Cymbidium* × 'Adelma.' Mrs. Paterson, Ardingly: *Miltonia* × 'Sheila.' E. Kenneth Wilson, Esq., Wimbledon: *Cymbidium* × 'Rosalind.'

February 20, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Award of Merit.

To Cymbidium x 'Pervaneh' (insigne x 'Flamingo') (votes 12 for), from Messrs. H. G. Alexander, Tetbury (see p. 303).

To Cypripedium × 'Peter Arnott' ('Nena' × 'Gertrude West') (votes 12

10 Cypripedium × 'Peter Arnott' ('Nena' × 'Gertrude West') (votes 12 for, 2 against), from Messrs. Black & Flory, Slough (see p. 304).

To Vuylstekeara × 'Ephyra' (V. 'Aspasia' × O. × 'Cetus') (votes 11 for, 4 against), from Messrs. Charlesworth, Haywards Heath (see p. 307).

To Cymbidium × 'Pipit' var. 'Gladiolus' (Gottianum × 'Miranda') (votes 14 for), from F. J. Hanbury, Esq., Brockhurst, East Grinstead (see p. 303).

To Odontioda × 'Verona' (Oda. × 'Lydia' × Odm. crispum) (votes 10 for, 3 against), from Messrs. Charlesworth, Haywards Heath (see p. 306).

Vote of Thanks.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. H. G. Alexander, Tetbury, for a group. To Messrs. H. Dixon, Wandsworth, for a group.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group. To Messrs. McBean, Cooksbridge, for a group.

To Messrs. Black & Flory, Slough, for a group.

NOTICES TO FELLOWS.

Journal.

The JOURNAL, which has in the past been issued to Fellows and Associates in half-yearly parts, will be issued to all Fellows and Associates monthly, commencing September 1934.

By this change it will be possible to keep Fellows and Associates in closer touch with the Society's activities, for besides the customary horticultural articles, the monthly parts will draw attention to coming events and will contain an account of the current work of the Society, Committees, Awards, Shows, Wisley Gardens, etc.

Additional copies required by Fellows and Associates, is. each, post free. Price to non-Fellows, is. 6d. each, post free.

Garden Demonstrations at Wisley, 1934.

Practical demonstrations of garden operations will be held from 2 P.M. to 4 P.M., weather permitting, as follows:

Nov. 14, 15. Planting Fruit Trees and Roses.

Dec. 5, 6. Pruning Fruit Trees.

Fellows desiring to attend these practical demonstrations are asked to notify the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, of their intention beforehand.

Dry Bulb Show.

On August 28–29, besides the fortnightly display of fruits and flowers, there will be a special exhibition of British and Empire grown bulbs held by the Society for the purpose of encouraging the Bulb Growing Industry within the country and the Empire. Fellows will be able to obtain first-hand information on the sources of supply, and it is hoped they will do their best to support the industry.

The Great Autumn Show.

The Great Autumn Show will be held at the Crystal Palace on September 19 to 22. On this occasion the usual competitive Fruit and Vegetable Show and a Conference on Apples and Pears will be held there. Schedules are obtainable from the Secretary. In the September number of the JOURNAL a special leaflet will be inserted guiding visitors as to the best way to get to the Crystal Palace.

Fruit Conference Programme.

FIRST DAY, WEDNESDAY, SEPTEMBER 19.

Afternoon Session 3-5 P.M.

Chairman—Lord Aberconway, C.B.E., President of the Royal Horticultural Society, supported by Mr. E. A. Bunyard, F.L.S., Chairman of the Fruit Conference Committee.

"Winter Pruning of Apples, Pears and Plums," Mr. James Wilson.

"Summer Pruning of Hard Fruits," Mr. A. H. Lees.

Mr. F. Bostock and Dr. H. E. Durham will take part in the discussion.

SECOND DAY, THURSDAY, SEPTEMBER 20.

Morning Session II-I P.M.

Chairman—Sir Frederick Keeble, C.B.E., M.A., Sc.D., F.R.S., F.L.S.

"The Basis of the Classification, Identification and Nomenclature of Fruits." Mr. E. A. Bunyard will open the discussion, followed by Mr. H. S. Rivers.

Dr. T. Swarbrick, of the Long Ashton Expt. Station, and Mr. H. V. Taylor, Commission for Horticulture, will take part in the discussion.

Afternoon Session 3-5 P.M.

Chairman—Sir E. John Russell, D.Sc., F.R.S.

"The Effect of Orchard Conditions on Fruit Quality," Dr. T. Wallace.

The discussion will be opened by Mr. W. A. Bane, of East Malling. Mr. W. P. Seabrook and Mr. W. G. Kent will take part.

THIRD DAY, FRIDAY, SEPTEMBER 21.

Morning Session II-I P.M.

Chairman—Sir William G. Lobjoit, O.B.E., J.P., V.M.H.

"The Fruit Trials at Wisley," Sir Daniel Hall, K.C.B., F.R.S.

"New Varieties," Mr. A. N. Rawes.

Mr. Paget Norbury will open the discussion.

"The Fruit the Public Wants," Mr. H. L. Taylor.

Afternoon Session 3-5 P.M.

Chairman-Mr. Spencer W. Mount.

"Pears from the Commercial Aspect," Mr. T. Neame.

Mr. W. T. Edmonds will open the discussion.

"Stocks for Pears," Mr. R. G. Hatton, C.B.E., V.M.H.

"Storage of Hard Fruits," Dr. Kidd and Dr. West.

EXCURSION, SATURDAY, SEPTEMBER 22.

Excursion to see Fruit Trials at Wisley.

Other Papers, including the following, will be printed in the Report.

- "The Gathering and Storing of Apples and Pears," Mr. E. Neal.
- "The Forms of Fruit Trees for the Amateur's Garden," Mr. A. N. Rawes.
 - "The Raising of New Varieties," Mr. M. B. Crane.
 - " Pollination in Orchards."

Local Varieties of Apples.

In connexion with the Conference on Apples and Pears which is to be held at the Great Autumn Show, a special exhibition of apples including local varieties will be staged to assist a Committee dealing with Classification and Nomenclature, and the Secretary would be pleased to receive exhibits of local varieties other than those usually listed in the nurserymen's catalogues: not less than six fruits of each, accompanied by foliage, will be required.

All persons able to assist in this matter are asked to send to the Secretary as soon as possible and not later than September 1, 1934, a list of the local varieties of their neighbourhood (other than the generally well-known or market varieties such as 'Bramley's Seedling,' 'Cox's Orange Pippin,' 'Worcester Pearmain,' etc.) which they would be able to collect and send. The lists received will be co-ordinated and the individual offers dealt with accordingly; and a package for forwarding the fruit will be sent.

The Lily Group.

The last meeting of the year of the Lily Group will take place on Tuesday, October 9, when a discussion on a comparison of Lily Bulbs in the dry state will take place in the Restaurant of the Old Hall at 5 P.M.

The Membership of the Group is open to all Fellows and Associates of the Society without further subscription, and all members of the Group are notified by post of Group Meetings.

Daffodil Conference, 1935.

In April 1935 a Conference on Daffodils will be held in conjunction with the Annual Daffodil Show.

The programme is obtainable on application to the Secretary.

Small Exhibits from Fellows.

It frequently happens that a Fellow who has insufficient plants to stage a group at a Fortnightly Show would like other Fellows to see some particular plant which he has in bloom. The Council cordially invites such exhibits, which are often of great interest. Any Fellow

who wishes to stage an exhibit consisting of not more than three pots, pans, or vases may do so although he has not applied for space beforehand. Such exhibits should be entered with the clerk at the Small Exhibits Table by noon on the morning of the Meeting, and he will provide exhibitor's cards and stage the exhibits.

Inspection of Fellows' Gardens.

The inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz. a fee of £3 3s. for one day (or £5 5s. for two consecutive days), together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Should two or more Fellows residing in the same district, with their Gardens within easy reach of one another, desire to have the services of the Garden Inspector, arrangements will be made for such a combined inspection, and the fee and expenses divided by consent of those concerned. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their Garden. Gardens can only be inspected at the written request of the owner.

The Appalachian Mountain Plant Expedition.

On Tuesday, August 28, 1934, Mr. T. H. Everett, N.D.H., will give an account of the recent plant-hunting expedition to the Appalachian Mountains in the Lecture Room of the Greycoat Street Hall at 3.30 P.M.

BOOKS AND PAMPHLETS PRESENTED, PURCHASED OR REVIEWED DURING THE HALF-YEAR ENDING DECEMBER 31, 1933, AND DEPOSITED IN THE LINDLEY LIBRARY.

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Abbreviations.—Col. pls. = coloured plates; illus. = illustrated; rev. = revised; pls. = plates; ed. = editor, edited or edition; n.d. = no date; n.p. = no place (of publication given).

When books are published in London, the place of publication is not named in the entry.

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                                                                      (Bull.
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                                                                      New
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                                                                         (1)
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(I) 8vo. (I)

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EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

NOTICES TO FELLOWS.

COMING EVENTS.

The object of these notes, which it is intended to publish monthly, is to provide a useful guide to the activities of the Society, supplementing, as they will, the calendar of events printed on the tickets.

Each month, the events of the month of issue and the following month will be described, with as little redundancy or repetition as possible, to remind

Fellows and Associates of meetings, etc.

In this connexion it may be well to call again to the notice of Fellows and Associates that they are invited to send to the Fortnightly Shows interesting or well-grown plants (flowers, fruits or vegetables) for display on the "Small Exhibits Table." Such exhibits should be in place before noon of the day of the Show.

September 11, 1934.—The first Fortnightly Meeting and Show of the autumn. Dahlias are likely to be the predominant feature on this occasion.

Mr. J. B. RIDING will lecture on "Dahlias" at 3.30 P.M.

September 19-22, 1934.—The great Autumn Flower Show, in conjunction with the Conference on Apples and Pears and the annual Fruit and Vegetable Show with its competitive classes, will be staged at the Crystal Palace—the renovated and rejuvenated Crystal Palace as it is to-day—and the Show will no doubt be one of the finest recently seen in this country, as the whole of the main floor of the vast building will be filled with flowers and fruit.

Memories of the Crystal Palace Shows in past years include a very tedious

Memories of the Crystal Palace Shows in past years include a very tedious railway journey, but the leaflet issued with this number of the JOURNAL shows how easily the Crystal Palace can be reached from London, in fact, in almost as short a time as were the previous venues of the Autumn Show at Olympia or

Holland Park Rink at Shepherd's Bush.

For motorists there are ample parking arrangements with easy access of the

main (High Level) entrance.

There will be ample provision for lunch and other refreshments and rooms for various lectures, with the added advantage that a rest of half an hour or so can be spent in the gardens, not counting the additional attraction on the Thursday evening of a firework display.

THE AUTUMN FLOWER SHOW

like its sister the Spring Show at Chelsea, is a great opportunity for the meeting of the gardening world to discuss the year's work and make preparations for the coming year. It is customary to find magnificent exhibits of Roses, Dahlias and Chrysanthemums, the best of herbaceous plants, exhibits of stove and greenhouse plants, Begonias and rock plants, and of shrubs beautiful in leaf-colour and berry in the autumn; all these are sure to be well represented, as well as fruits and vegetables which are referred to later. Besides these there will be opportunities to restock the garden with appliances, as Horticultural Sundries of all kinds will be displayed. There will be exhibits of a scientific character, more

especially dealing with fruit and its diseases; and an Enquiry Bureau, where horticultural difficulties can be talked over and questions answered, will be at the service of visitors to the Show. The Schedule of the Autumn Flower Show is obtainable on application to the Secretary; the closing time for entries is already past.

The Committees to examine new plants, flowers and fruits submitted for certificate will meet on Wednesday, September 19, as follows:—

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Joint Dahlia Committee . . . . . . . . . . . at 11.15 A.M. Fruit and Vegetable Committee . . . . . . . . . at 12 noon. Floral Committee A (Florists' Flowers) . . . . . . . . . . at 12.15 P.M. Orchid Committee B (other than Florists' Flowers) . . . . . . . . . at 11.45 A.M.
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Plants, flowers, and fruits for certificate, should be entered with the Secretary of the appropriate Committee on Tuesday, September 18, but entries will be accepted up to the following times on Wednesday, September 19:—

Orchids .			up to 10.30 A.M.
Dahlias			up to 10.45 A.M.
Fruits and Vegetables			up to 11.30 A.M.
All other Plants .			up to II.45 A.M.

The Show opens on Wednesday, September 19, 1934, at noon, and remains open until 9.30 P.M. on that day. On Thursday and Friday, September 20 and 21, it is open from 10 A.M. till 9.30 P.M. On Saturday, September 22, it is open from 10 A.M. till 6 P.M.

Fellows are reminded that there will be a table for small exhibits of plants of interest just as at the fortnightly Shows, and they are invited to bring up interesting or well-grown plants (flowers, fruits or vegetables). Such exhibits should be entered with the Clerk at the table by noon on Wednesday, September 19.

An important feature of a national character at the Meeting will undoubtedly be the holding of the

CONFERENCE ON APPLES AND PEARS.

It is now long since the Society held a Fruit Conference in connexion with its Autumn Fruit Show, and recent years have been marked by remarkable progress. The technique of spraying was little known thirty years ago, and research was practically untouched in this country. The Conference will, therefore, afford an excellent opportunity for Fellows to learn what progress has been made, the results of which are of the greatest importance for all gardens large and small.

The Conference will open on Wednesday, September 19, at 3 o'clock when the President will take the Chair. This session will be devoted to the question of Winter and Summer Pruning with special reference to the amateur's needs, and as it will be hardly possible to discuss Summer Pruning without referring to the system known as the Lorette Pruning, a lively discussion may be anticipated. Mr. James Wilson, Mr. A. H. Lees, Mr. F. Bostock, and Dr. H. E. Durham have promised to open or take part in the discussion.

On Thursday morning September 20, at 11 o'clock, Sir Frederick Keeble will preside, and the subject will be that of the identification and naming of fruit. Experts will discuss and reveal the methods by which they identify fruits and quite probably criticize older systems and classifications. Mr. E. A. Bunyard will open the discussion, which will be continued by Mr. H. S. Rivers, Dr. T. Swarbrick, and Mr. H. V. Taylor.

The afternoon session on Thursday, from 3 P.M. to 5 P.M., will deal with fruit quality and the conditions which determine and modify it. Much important research has been done on this question in recent years, and all those fruit growers who are anxious to improve the quality of their fruit will, we do not doubt, come away much enlightened. Sir John Russell of Rothamsted will preside. Dr. Wallace will introduce the subject, and be supported by Mr. W. A. Bane of East Malling, Mr. W. P. Seabrook, and Mr. W. G. Kent.

On the third and last day, Friday, September 21, Sir William Lobjoir will be in the Chair in the morning, 11 A.M. to 1 P.M.; the subject will be the Fruit Trials at Wisley and new varieties in general. Sir Daniel Hall will give a description of these trials, and Mr. A. N. Rawes that of new varieties, Mr. Paget Norbury opening the discussion. Mr. H. L. Taylor will speak on "The Fruit the Public Wants."

The afternoon, from 3 to 5 P.M., will be devoted to Pears from the commercial point of view. One of the most successful growers of 'Doyenné du Comice'

Pears will give his methods, and his results will no doubt be found, as usual, in the front place on the Show benches. There is no reason why the cultivation of Pears should not be very largely increased in this country, and it is hoped that this afternoon's discussion will stimulate interest in this matter. Mr. Spencer Mount will be in the Chair and Mr. T. Neame will be the principal speaker on "Pears from a Commercial Point of View," and Mr. R. G. Hatton, V.M.H., on "Stocks for Pears." Mr. W. T. Edmonds will open the discussion. "The Storage of Hard Fruits" will be dealt with by Dr. KIDD and Dr. WEST.

A certain number of copies of the addresses to be given by the openers of the discussions will be available before the Conference and can be obtained on

application to the Secretary.

On Saturday an excursion to Wisley to see the Fruit Trials will be arranged, and will be open to such members as advise the Secretary that they wish to attend the Conference. The Conference is mainly for Fellows, but the Society has always welcomed visitors from home or abroad, and those who have no tickets available should write to the Secretary concerning it.

THE EXHIBITION OF FRUIT

will probably be of very special interest, thanks to the happy chance that a large crop will be available this year. Besides the usual competitions at the Fruit Show, a special effort is being made to collect local varieties of Apples and Pears of such varieties as are not in commerce. Fellows are asked to assist in making this section as complete as possible, for it is hoped it will serve the purpose in many instances of getting the correct names of local varieties. Instructions for collection and forwarding will be sent by the Secretary to anyone who is interested.

There will be competitive classes for vegetables, and amateurs are invited to

send exhibits from their gardens in competition.

The Schedule for the competitive classes for Fruit and Vegetables can be obtained from the Secretary, and Fellows will note that there are even classes for single dishes, which enables the smallest grower to compete: the closing date of entries is the first post on Wednesday, September 12, 1934.

The Fruit Show provides a meeting place for fruit growers and gardeners from all over the country, and this combination with the Great Autumn Show should make the event a great attraction to all interested in Horticulture.

October 1, 1934.—New Fellows elected to the Society between October 1, 1934, and January 1, 1935, will enjoy all the privileges of Fellowship including attending the remaining Meetings of the year 1934, on payment of their subscriptions for 1935.

October 9, 1934.—Fortnightly Meeting and Show: Chrysanthemums and autumn colouring shrubs are likely to be the main features of the Show, and Orchids are likely to be more numerous than of late. Exhibits of Apples and Pears

will be regularly seen from now onwards.

Members of the Lily Group and all particularly interested in Lilies are reminded that in the evening at 5 P.M. in the Restaurant of the Old Hall a discussion on Lily bulbs in the dry state will take place. The discussion will be the control of the Old Hall and Mr. W. A. CONSTABLE and Members are opened by Mr. J. Courts, V.M.H., and Mr. W. A. Constable, and Members are invited to bring exhibits, photographs, or lantern slides illustrating the form and growth of Lily bulbs.

October 23-24, 1934.—Fortnightly Meeting and Show: Orchids, stove and greenhouse plants and berried shrubs. This Meeting is often one of the most interesting of the year, as on this occasion Orchids are often seen at their best and in their greatest variety. Stove and greenhouse plants seldom seen except at Chelsea and the Autumn Show again appear on the exhibition benches and the berried shrubs should be at their best.

The following Challenge Cup and Trophies to be won outright, presented by

the Orchid trade, will be competed for :-

(a) A Challenge Cup for the best group of Orchids exhibited at the Fortnightly Show on October 23–24, 1934, in a space not exceeding 60 square feet, by an amateur who employs not more than three assistants in the Orchid houses, including the head gardener.

(b) A Silver Trophy for the best twelve Orchids, not more than two of any one genus, exhibited by an amateur who employs not more than two

growers, including the head gardener, in his Orchid house.
(c) A Silver Trophy for the best six Orchids exhibited by an amateur who employs not more than one orchid grower or gardener.

clx PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Entries must be made on special forms obtainable from the Secretary, by whom the completed forms must be received not later than by the first post on the Wednesday preceding the Show, October 17, 1934.

There will be a lecture in the Lecture Room, in the New Hall, at 3.30 P.M., by

Captain R. C. H. JENKINSON, on "Trees for the Small Park and Garden."

CALENDAR 1935.

The calendar of 1935 is now in preparation, and it is possible to give the dates of some of the principal events of the Society for 1935.

Annual Meeting, February 19. *Daffodil Conference, April 16-17. Chelsea Spring Flower Show, May 22-24. Amateur's Flower Show, June 25. *Soft Fruit Conference, July 15-20.

* Programmes of these Conferences may be had on application to the Secretary.

PUBLICATIONS.

The Daffodil Year Book, 1934 (the second of the new series), was published in August and contains many articles of interest to all who grow Daffodils at home or abroad, accounts and illustrations of new varieties, and reports of exhibitions in England and in the Southern Hemisphere.

The Lily Year Book, 1934 (the third year of its appearance), will be published in October.

These Year Books are obtainable from the Secretary, price 5s. in paper cover, 6s. in cloth.

WISLEY GARDENS.

Fellows will find the great Collection of Apples and Plums in the Commercial Fruit Trials at the north end of the Garden at Wisley particularly interesting during September, for all the new varieties of promise are growing and most are cropping well there along with the older standard varieties for comparison.

A further matter of interest to those who grow fruit will be the trial of grease bands and banding materials that commences in September. This trial will be continued until the spring and will be carried out on the standard trees near the new herbaceous border.

The trials of Michaelmas Daisies and of Dahlias among the plants of which "Standard Collections" are maintained, and of Garden Nasturtiums (Tropaeolums) including the new "Gleam" hybrids will be at their best during the month, while many trees and shrubs grown for the brightness of their fruits will, in this early season, be showing them to advantage.

GENERAL MEETINGS.

MARCH 6, 1934.

Mr. Thomas Hay, M.V.O., V.M.H., in the Chair.

A lecture was given by Mr. A. P. Balfour on "Some South African Annuals" (see p. 216).

MARCH 20, 1934.

SEWELL MEDAL COMPETITIONS.

The Sewell Medal, for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house.

Amateur Growers' Medal.

To Mark Fenwick, Esq., Abbotswood, Stow-on-the-Wold, Glos.

Trade Growers' Medal.

To Messrs. Clarence Elliott, Stevenage.

A lecture was given by Mr. E. A. Bowles, M.A., F.L.S., V.M.H., on "Plants in Season."

Chairman, Mr. C. T. Musgrave, V.M.H.

APRIL 4, 1934.

Mr. W. B. CRANFIELD, F.L.S., in the Chair.

A lecture was given by Mr. James Douglas on "Auriculas" (see p. 283).

APRIL 11, 1934.

DAFFODIL SHOW.

CHIEF AWARDS IN THE COMPETITIVE CLASSES.

The Engleheart Challenge Cup and a Silver-gilt Flora Medal, for twelve varieties of Daffodils raised by the exhibitor.

To Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim.

Silver-gilt Banksian Medal, for twelve varieties of Daffodils not in commerce. To Mr. J. L. Richardson, Prospect House, Waterford.

APRIL 17, 1934.

EARLY MARKET PRODUCE SHOW.

COMPETITIVE CLASSES.

The chief Awards in the competitive classes were:

Silver Cup for the most successful competitor.

To Mr. F. A. Secrett, Walton-on-Thames.

Silver Knightian Medal, for the competitor gaining the highest number of prize-points for salad vegetables.
To Mr. F. A. Secrett, Walton-on-Thames.

Silver Knightian Medal, for the competitor gaining the highest number of prize-points for forced vegetables.

To Mr. F. A. Secrett, Walton-on-Thames.

Silver Knightian Medal, for the competitor gaining the highest number of prize-points for outdoor-grown vegetables.

To Mr. F. A. Secrett, Walton-on-Thames.

Silver Banksian Medal, for the competitor gaining the highest number of prize-points for flowers.

To Mr. F. A. Secrett, Walton-on-Thames.

NON-COMPETITIVE EXHIBITS.

The outstanding exhibit was a co-operative display of vegetables and fruit for which the Schedule Committee was responsible.

The following Awards were made:

Gold Medal.

To the British Flower Marketing Association, for a co-operative exhibit of flowers.

To Mr. F. A. Secrett, Walton-on-Thames, for an exhibit of vegetables and flowers in market packages.

To the Spalding & District Bulb Growers' Association, for an exhibit of flowers in market packages and bunches.

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Silver-gilt Banksian Medal.

To the Sussex Nurseries, Rustington, for flowers, vegetables and fruit as grown for market.

Silver Banksian Medal.

To Mr. Philip Ladds, Swanley Junction, for pot plants for market.

To the West Country Growers' Association, for vegetables and flowers as grown for market.

Knightian Medal.

To the Cheltenham Growers' Club, for vegetables in market packages.

To Miss K. Courtauld, Earls Colne, for forced fruit and vegetables.

To the South Lincolnshire Growers, for vegetables in market packages.

To Messrs. Toogood, Southampton, for early vegetables.

Banksian Medal.

To Mr. Douglas Foxwill, Balcombe, for sweet peas as packed for market.

DISCUSSION.

Chairman, The Lord Aberconway, C.B.E.

In a discussion on "Quality in Early Vegetables" the chief speakers were: Dr. W. F. Bewley (The Research Worker); Mr. C. Bianchi (The Chef); Lady Muriel Beckwith (The Housewife); Mr. W. B. Shearn (The Retailer); Mr. C. S. Lancashire (The Wholesaler); Mr. F. A. Secrett (The Grower) (see p. 330).

SCIENTIFIC COMMITTEE.

March 6, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twelve other members present.

Moss deposit.—Dr. Tincker reported that the moss forming the deposit at Ulverston had been identified as *Hypnum scorpioides*, a somewhat uncommon British moss (see p. cxx).

Galanthus from Trebizond.—The name decided upon for the form of Galanthus latifolius shown at the last meeting (p. cxx) and characterized by the narrow foliage is var. rizehensis, in reference to the town on the Black Sea near which it was found.

Lizard Orchis.—An enquiry regarding the raising of seed of the Lizard Orchis was received. None knew of this being attempted, but experience in attempting to grow it by both Mr. Odell and Mr. Bowles indicated a short life of 3 or 4 years in cultivation, and its death after flowering. This may be due to damage sustained by the foliage from frost as it is formed early.

Birds eating insect galls.—Mr. Wilson drew attention to a somewhat new habit of tits in eating the soft tissue of galls produced on apples by the woolly aphis, and to galls of the cabbage gall weevil on Swedes being eaten by starlings, a photo-

graph of which he showed.

British mints.—Mr. Fraser showed dried specimens of Mentha rubra var. callimorpha.

Fruits of Michelia sp.—Fruits of Michelia sp. together with some other fruits of curious form collected by Capt. Kingdon Ward on his last expedition were shown.

Fritillaria messanensis var. atlantica was shown by Mr. Rosenheim. This plant has recently been figured in the Bot. Mag. as F. oranensis, but according to Maire, who has studied these plants in the field, it differs in detail from F. messanensis var. oranensis.

Atherosperma moschatum.—Mr. Preston of Hayes exhibited flowering specimens of this Australian plant, from Tasmanian seed. Comber collected it in Tasmania, where it is a common shrub. It is apparently nearly hardy.

Bedfordia salicina, another Tasmanian shrub of the same origin, was sent from the Society's garden. It has long foliage grey beneath and numerous sweetscented Groundsel-like flowers.

Crocus seedlings.—Mr. Bowles showed a number of seedlings of Crocuses, including the brown-backed race of C. chrysanthus, C. stellaris, C. versicolor, a dark form of C. vernus from Spain, and numerous seedlings, some tending to red, of C. Tomasinianus.

Forsythia ovata.—A flowering specimen of this Korean species, with small broad-petalled sessile flowers, was shown from the Director, Royal Botanic Gardens, Kew.

Effect of ringing.—Mr. Hay showed a branch of a Lime tree from the Mall, from which the bark had been removed for a length of several inches quite round the branch. The branch had lived five years and as usual had thickened considerably above the wound.

March 20, 1934, Mr. A. D. COTTON, F.L.S., in the Chair, and nine other members present.

Cedrela serrata.—Mr. Cotton reported that the fruit shown at the last meeting, collected by Capt. Kingdon Ward, was that of Cedrela serrata.

Foliage of Scilla bifolia alba streaked.—Dr. Tincker drew attention to the yellow streak in the foliage of Scilla bifolia which he had found at Wisley. Its cause was unknown and further observations are necessary.

Lachenalia sp.—Mr. Crane showed a species of Lachenalia from the John Innes Institution which Mr. Cotton took for identification. Mr. Crane remarked that the basic numbers of chromosomes found in Lachenalia hitherto were 7, 8 and 11 (see below).

British Willows.—Mr. Fraser showed a specimen, the first he had seen, of the 3 form of Salix purpurea Lambertiana (of which S. purpurea woolgarica was a seasonal form), and of the Q form of S. purpurea \times repens which is usually 3.

Cyclamen.—A Cyclamen, shown by Messrs. Sutton and recently received by them, for which a claim for hardiness was made, and which was alleged to be a cross between C. persicum and a North African species, was put back for further enquiries and tests. The foliage was narrower than normal for C. persicum and bore some resemblance to that of C. neapolitanum. The flowers were white and produced in profusion.

Hippeastrum foliage.—The young foliage of a Hippeastrum bearing numerous scarlet warted growths was shown. These warts were the result in all probability

of the attack of a mite.

April 4, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and seven other members present.

Identifications at Kew.—Mr. Cotton reported that the fruits taken by him at the last meeting were those of a Pittosporum, the species of which could not be determined, and that the Lachenalia from the John Innes Institution had been identified at Kew as L. nervosa.

Salix magnifica.—Mr. Fraser showed dried specimens of Salix magnifica, and remarked that Schneider had separated as another species a form with crisp-haired ovary whereas S. magnifica has a glabrous ovary. This is the only distinction between the two plants and the staminate forms will therefore be indistinguishable.

Large-catkined Willow.—A Willow, referred to this Committee from Floral B, sent by Lord Aberconway, with large staminate catkins was taken by Mr. Fraser for examination (see below).

Lachenalia sp.—A species of Lachenalia from Namaqualand was referred to Kew for identification. It was introduced by Dame Alice Godman (see p. clxiv).

Scilla Adlami.—A curious Scilla, with single linear leaves widest above the middle and small mauve flowers, from the mountains of Natal, sent by Mrs. Garnett-Botfield, was identified as S. Adlami. It has stolons as well as bulbs.

April 17, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twelve other members present.

Salix Medemii.—Mr. Fraser reported that the Salix shown by the President at the last meeting proved to be Salix Medemii, a species of the section Capreae. This is closely allied to S. cinerea Linn., but it flowers in February or March, has the filaments united for one-fourth of their length, and has an oblong orange nectary.

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Lachenalia hirta.—Mr. Cotton reported that the Lachenalia from Namaqualand

shown at the last meeting proved to be L. hirta.

New shrub from Tibet.—Mr. Baker showed specimens from Tibet of Capt. Kingdon Ward's collecting allied to Caragana, but differing from known species in the chartaceous pods and in other details.

Mango.—Mr. Hosking showed a Mango fruit and drew attention to the

fibrous husk in which the large fleshy seed is enclosed.

Chimera in Japanese Peach.-Mr. Collingwood Ingram showed a branch of a Japanese peach in which one sprig showed deep pink flowers, the remainder

being some white, some striped white and deep pink.

Sophrocattleya x 'Sistron.'-Dr. Hurst drew attention to this hybrid shown in two forms to-day, one of them reddish on a white base showing the bicolored lip appearing in the second generation, the other having a yellow ground derived from Cattleya aurea. The cross is Sopronitis grandiflora × Cattleya × Adulla (C. bicolor × C. × Hardyana (C. Warscewiczii × C. aurea)).

FRUIT AND VEGETABLE COMMITTEE.

March 6, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Award Recommended :-

Silver Knightian Medal.

To Sussex Nurseries Ltd., Rustington, for Mushrooms, Tomatos, Lettuce and Strawberries.

Other Exhibits.

Mr. C. H. Cook, Royal Gardens, Windsor: Apples 'Ohinemuri,' 'Lord Wolseley,' and 'Ballarat Seedling.'

Mrs. M. MacLaren, Redruth: Fruit of Cyphomandra betacea.

March 20, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twenty other members present.

Exhibits.

Mr. E. Betts, Haywards Heath: Seedling Apple. Messrs. J. Basham, Bassaleg: Apple 'St. Cecilia.'

C. G. A. Nix, Esq., Crawley: Apples 'Lord Hindlip,' 'Herefordshire Beaufin, 'Count Pendu Plat.

April 4, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and twelve other members present.

Exhibits.

Marchioness of Londonderry, Newtownards: fruits of Chinese Early Cherry. Mr. H. Barnett, Tilehurst: Apples 'D'Arcy Spice,' Sturmer Pippin.'

FLORAL COMMITTEE A.

March 6, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Carter, Raynes Park, for Daffodils, Primulas, and Tulips.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. G. H. Dalrymple, Bartley, for Freesias. To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Wakeley, London, for Crocuses.

Banksian Medal. To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc.

To Army Vocational Training Centre, Chisledon, for Cinerarias.

To Swanley Horticultural College, for Hippeastrums.

Cultural Commendation.

To Mr. W. A. Bright, gardener to Mrs. Coningsby Disraeli, O.B.E., High Wycombe, for Violets.

Selected for trial at Wisley.

Primula malacoides 'Sutton's Giant,' from Messrs. Sutton, Reading.

The awards recommended to Perpetual-flowering Carnations on trial at Wisley were confirmed.

Other Exhibits.

Mrs. F. A. Denny, Bletchley: *Primula malacoides* 'Horwood House Hybrid.' Messrs. Wakeley, London: Crocus 'Princess Juliana.' Windward Violet Farm, Dawlish: Violets.

March 20, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :-

Silver Flora Medal.

To Messrs. Bath, Wisbech, for Crocuses, Daffodils, and Tulips.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. G. H. Dalrymple, Bartley, for Freesias. To Messrs. Dobbie, Edinburgh, for Cinerarias.

To Sir George H. Kenrick (gardener Mr. I. V. Macdonald), Edgbaston, for Hippeastrums.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Wakeley, London, for Hyacinths.

To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc.

Banksian Medal.

To Messrs. Toogood, Southampton, for Primulas.

Award of Merit.

To Carnation 'Ditchling' for cutting and market (votes unanimous), from

Messrs. Allwood, Haywards Heath (see p. 354).

To Hippeastrum 'Susan' as a greenhouse pot plant (votes 12 for, 4 against), from Mrs. R. Rushbrooke (gardener Mr. G. W. Clarke), Hatfield (see p. 356).

The following award was made after trial at Wisley:

Commended.

To Cineraria 'Rainbow,' sent by Messrs. Carters Tested Seeds, Raynes Park (see p. 354).

Other Exhibit.

Miss H. Torr Jennings, Streatham Common: Primula 'Wanda.'

April 4, 1934, Mr. J. M. BRIDGEFORD in the Chair, and fifteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

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Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc.

To Messrs. Low, Enfield, for Carnations.

To Messrs. Wakeley, London, for Lilies of the Valley, Scillas, Crocuses, etc. Other Exhibits.

Mr. J. Douglas, Great Bookham: Auriculas. Mr. E. Ladhams, Elstead: Violet 'Elstead Lavender' (to be seen again).

April 17, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants. Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Schizanthus.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Chaplin, Waltham Cross, for Roses. To Mr. G. H. Dalrymple, Bartley, for Auriculas and Primulas.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

To Mr. F. Ladds, Swanley Junction, for Cinerarias.

Flora Medal.

To Mr. J. Douglas, Great Bookham, for Auriculas.

Banksian Medal.

To Dean Gardens, Longniddry, for Primroses.

To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies, etc.

To Mr. H. G. Longford, Abingdon, for Polyanthus. To Mr. C. Wall, Bath, for Aquilegias.

Selected for trial at Wisley.

Primula 'Downshill Blue Peter ' from Lionel de Rothschild, Esq., Exbury. Schizanthus 'Bath Giant Blotch' from Messrs. Blackmore & Langdon, Bath.

Messrs. B. R. Cant, Colchester: Rose 'Samuel Pepys.'

Mrs. A. Fremantle, Penn: Primulas.

A. Hosking, Esq., Guildford: Primula 'Tess.'
Mr. R. V. Roger, Pickering: Primula 'Firby Glory.'
Baron Schröder, Englefield Green: Clivia 'Marga Schröder.'
Mr. G. E. P. Wood, Ashtead: Primula 'Prince Purple.'

FLORAL COMMITTEE B.

March 6, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-five other members present.

Awards Recommended :--

Silver-gilt Banksian Medal.

To Messrs. C. Elliott, Stevenage, for alpine plants in pans.

To Messrs. Waterer, Sons & Crisp, Bagshot, for flowering shrubs.

Silver Banksian Medal.

To Messrs. Casburn, Bedford & Page, Cambridge, for alpine plants in pans.

To Messrs. J. Cheal, Crawley, for alpine plants and shrubs. To Messrs. L. R. Russell, Richmond, for flowering shrubs. To Mr. G. E. Welch, Cambridge, for alpine plants in pans. Banksian Medal.

To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.

To Brookside Nurseries, Oxford, for Saxifrages in pans.

To Dartington Hall, Totnes, for alpine plants in pans.

To Mr. T. M. Endean, Laindon, for succulents.
To Messrs. Hemsley, Crawley, for shrubs.
To Messrs. Hillier, Winchester, for flowering shrubs.

To Hocker Edge Gardens, Cranbrook, for bulbous plants in pans.

To Messrs. M. Prichard, Christchurch, for alpine plants and shrubs.

To Messrs. Reuthe, Keston, for alpine plants and shrubs. To Messrs. D. Stewart, Ferndown, for shrubs and bulbous plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for alpine plants.

Award of Merit.

To Azara integrifolia as a tender flowering shrub (votes 13 for, 6 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross (see p. 354).

To Pomaderris elliptica as a flowering shrub for the cool greenhouse (votes 20 for), from E. M. Preston, Esq., Hayes, Kent (see p. 356).

Other Exhibits.

Messrs. Allen, Newick: flowering shrubs.

Alpine Nurseries, Ltd., West Moors: alpine and bulbous plants. Messrs. Baker, Codsall: alpine and bulbous plants.

F. Barker, Esq., Stevenage: Saxifraga 'Nathalie.' Chez Nous Nurseries, Newick: Saxifrages in pans.

Messrs. Clark, Dover: shrubs.

Dorset Nurseries, Blandford: alpine plants and shrubs.

Col. Garwood, Croydon: Saxifrages in pans.
Dame Alice Godman, D.B.E., Horsham: Lachenalia ovatifolia.

Misses Hopkins, Coulsdon: rock plants.

The Director, Royal Botanic Gardens, Kew: Forsythia ovata.

Mrs. Robert Lukin, Burghfield Common: Asphodelus acaulis.

Messrs. Maxwell & Beale, Broadstone: heaths and alpine plants. Mrs. R. S. Milford, Chedworth: alpine plants in pans.

Owermoigne Nurseries, Dorchester: alpine plants in pans.

E. M. Preston, Esq., Hayes, Kent: Atherosperma moschata.
P. Rosenheim, Esq., East Molesey: Fritillaria messanensis atlantica.
Mr. G. G. Whitelegg, Chislehurst: dwarf Conifers.

March 20, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Gold Medal.

To Admiral A. Walker-Heneage-Vivian, Swansea, for Rhododendrons.

Silver-gilt Banksian Medal.

To Messrs. C. Elliott, Stevenage, for Saxifrages and other alpine plants in pans.

To Messrs. Waterer, Sons & Crisp, Bagshot, for flowering shrubs.

To Mr. G. E. Welch, Cambridge, for alpine plants in pans.

Silver Banksian Medal.

To Messrs. Casburn, Bedford & Page, Cambridge, for Saxifrages and other alpine plants in pans.

To Messrs. Neale, Newhaven, for succulents.

To Messrs. L. R. Russell, Richmond, for flowering shrubs.

Banksian Medal.

To Alpine Nurseries, West Moors, for alpine and bulbous plants.

To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.

To Messrs. J. Cheal, Crawley, for flowering shrubs. To Dartington Hall, Ltd., Totnes, for alpine plants. To Mr. T. M. Endean, Laindon, for succulents.

To Hocker Edge Gardens, Cranbrook, for bulbous plants in pans. To the Rev. Rollo Meyer, Hertford, for bulbous Irises. To Messrs. M. Prichard, Christchurch, for alpine plants and shrubs. To Messrs. Waterer, Sons & Crisp, Twyford, for alpine plants.

Award of Merit.

To Acacia diffusa as a flowering shrub for the greenhouse (votes 10 for, 2 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross (see p. 354).

To Corydalis verticillaris as a flowering plant for the alpine house (votes 17 for), from Frank Barker, Esq., Stevenage (see p. 354).

Cultural Commendation.

To Mr. J. Shanahan, gardener to G. P. Baker, Esq., Sevenoaks, for a large pan of Saxifraga Burseriana var. 'Gloria.'

Other Exhibits.

Lord Aberconway, Bodnant: Primula cycliophylla. Mrs. F. H. Anderson, Hitchin: Anemone blanda.

Mrs. Gwendolyn Anley, Woking: Primula hirsuta. G. P. Baker, Esq., Sevenoaks: Saxifraga 'Crystalie' (S. Grisebachii x S. thessalica) .

Mr. G. H. Dalrymple, Bartley: Primula scapigera, a species new to cultiva-

Countess Grey, Howick: Primula sino-listeri.

Dr. P. L. Giuseppi, Felixstowe: Onosma Bourgaei.

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Mrs. H. W. Hall, Lymington: Kennedya prostrata, Chorizema cordatum.

Misses Hopkins, Coulsdon: rock plants. Mr. A. Kench, Weybridge: alpine plants and shrubs. Messrs. Baker, Codsall: shrubs and alpine plants. Chez Nous Nurscries, Newick: alpine plants.

Messrs. Allen, Newick: bulbous plants and shrubs.

Dorset Nurseries, Blandford: shrubs and alpine plants.

Messrs. Maxwell & Beale, Broadstone: alpine and bulbous plants. Dr. A. Gordon Paterson, Bracknell: Saxifraga 'Arthur.' E. M. Preston, Esq., Hayes, Kent: Libonia floribunda. Messrs. Prichard, Christchurch: Saxifraga 'The Duke.'

Messrs. W. H. Rogers, Southampton: alpine plants and shrubs.

Messrs. Russell, Richmond: Prunus Persica alba fl. pl.
C. R. Scrase-Dickins, Esq., Horsham: Veltheimia viridifolia.
Messrs. Sutton, Reading: Cyclamen hybrid.
Messrs. Waterer, Sons & Crisp, Bagshot: Corylopsis Veitchii.

Mr. W. Wells, jun., Merstham: Primula Inavatii.

 $\ensuremath{\textit{April}}$ 4, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Waterer, Sons & Crisp, Bagshot, for flowering shrubs.

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for flowering shrubs. To Messrs. M. Prichard, Christchurch, for alpine plants. To Mr. G. E. Welch, Cambridge, for alpine plants in pans.

Banksian Medal. To Messrs. Barr, Taplow, for Narcissi and other bulbous plants.

To Messrs. Cheal, Crawley, for alpine plants and shrubs. To Hocker Edge Gardens, Cranbrook, for bulbous plants in pans.

To Messrs. Stuart Low, Enfield, for greenhouse shrubs.

To Messrs. G. Reuthe, Keston, for Rhododendrons and other shrubs. To Messrs. L. R. Russell, Richmond, for greenhouse plants.

Award of Merit.

To Primula Winteri alba as a flowering plant for the rock garden and alpine house (votes 12 for, 1 against), from Lord Aberconway, Bodnant (see p. 356).

To Prunus Mume grandiflora as a hardy flowering tree (votes unanimous),

from Collingwood Ingram, Esq., Benenden (see p. 357).

Preliminary Commendation. To Primula kisoana as a hardy flowering plant (votes unanimous), from Lord Aberconway, Bodnant.

Cultural Commendation.

To Mr. Buckman, gardener to Major F. C. Stern, Goring-by-Sea, for a plant of Notholirion Thomsonianum.

Other Exhibits.

Lord Aberconway, Bodnant: Salix sp.

Messrs. Allen, Newick: dwarf shrubs and bulbous plants. Alpine Nurseries, Ltd., West Moors: alpine plants.

Messrs. Baker, Wolverhampton: shrubs and alpine plants.

Messrs. Burkwood & Skipwith, Kingston: shrubs.
Dorset Nurseries, Blandford: rock plants.
Dame Alice Godman, D.B.E., Horsham: Lachenalia sp.

T. Hay, Esq., Hyde Park: Aristea capitata.

Misses Hopkins, Coulsdon: rock plants.

C. Ingram, Esq., Benenden: Prinus subhirtella autumnalis. Lady H. J. Lowndes, Ringwood: Prinula Stuartii.

Messrs. Maxwell & Beale, Broadstone: alpine plants and shrubs.

Owermoigne Nurseries, Dorchester: alpine plants in pans.

Messrs. Redgrove & Patrick, Sevenoaks: shrubs.

Mesrs. W. H. Rogers, Southampton: alpine plants and shrubs.

Mr. G. E. Wood, Ashtead: rock plants.

April 17, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-three other members present.

Awards Recommended :-

Silver Banksian Medal.

To Dartington Hall, Ltd., Totnes, for Primulas and other alpine plants.

To Hocker Edge Gardens, Cranbrook, for bulbons plants in par-

Banksian Medal.

To Alpine Nurseries, West Moors, for alpine plants in pans.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for shrubs.

To Chez Nous Nurseries, Newick, for alpine plants and shrubs.

To Colesbourne Gardens, Cheltenham, for Fritillarias.

To Messrs. Hillier, Winchester, for flowering shrubs.

To Mr. E. Ladhams, Elstead, for shrubs and herbaceous plants.

To Messrs. Neale, Newhaven, for Gazanias and succulents.

To Messrs. Reuthe, Ltd., Keston, for Rhododendrons and other shrubs. To Messrs. Waterer, Sons & Crisp, Twyford, for alpine plants.

To Mr. G. E. Welch, Cambridge, for alpine plants in pans.

Award of Merit.

To Acacia decurrens as a tender flowering shrub (votes 17 for), from Viscountess St. Cyres, Lymington (see p. 354).

To Aristea capitata as a tender flowering plant (votes 12 for), from T. Hay,

To Chamaescilla corymbosa as a flowering plant (votes 12 102), from 1. 2123, Esq., Hyde Park (see p. 354).

To Chamaescilla corymbosa as a flowering plant for the alpine house (votes 10 for, 5 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross (see p. 354).

To Corylopsis platypetala var. laevis as a hardy flowering shrub (votes 9 for), from G. W. E. Loder, Esq., Ardingly (see p. 355).

To Forsythia suspensa atrocaulis as a hardy flowering shrub (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross (see p. 356).

To Movaen villosa as a tender flowering plant (votes 16 for), from Iris, Lady

To Moraea villosa as a tender flowering plant (votes 16 for), from Iris, Lady Lawrence, Burford (see p. 356).

Other Exhibits.

Messrs. Allen, Newick: alpine plants.
W. G. Baker, Esq., Oxford: Rhododendron ciliicalyx.
Messrs. Barr, Taplow: bulbous plants.

Messrs. Casburn, Bedford & Page, Cambridge: alpine plants in pans.
Dartington Hall, Ltd., Totnes: Primula hybrids.
Mrs. Denny, Staplefield: Primula 'Linda Pope.'
Mrs. Desborough, Broadstone: Polygala Chamaebuxus, Anemone nemorosa.
Dorset Nurseries, Blandford: rock plants and shrubs.

Mr. T. M. Endean, Laindon: succulents.

Lady Gregory, Sevenoaks: Camellia 'Lady Clare.'

Col. C. H. Grey, Cranbrook: Calanthe nipponica, Fritillaria pluriflora.

Messrs. Hemsley, Crawley: shrubs and rock plants.

Messrs. Hemsley, Crawley: shrubs and rock plants.

Misses Hopkins, Coulsdon: rock plants.

Collingwood Ingram, Esq., Benenden: Alnus firma multinervis.

Mr. W. E. Th. Ingwerson, East Grinstead: Primula 'Highness.'

G. W. E. Loder, Esq., Ardingly: Corylopsis yunnanensis, C. Gotoana,

C. Willmottiae, C. spicata, Daphne retusa.

Messrs. Maxwell & Beale, Broadstone: rock plants and shrubs.

Messrs. Padgrava & Patrick, Savencels: rock plants and shrubs.

Messrs. Redgrove & Patrick, Sevenoaks: rock plants and shrubs.

Messrs. Rogers, Southampton: alpine plants.
Viscountess St. Cyres, Lymington: Clematis Armandii, Illicium anisatum.
C. R. Scrase-Dickins, Esq., Horsham: Rhododendron repens.
Lt.-Col. H. Spender-Clay, Lingfield: Streptanthera cuprea.

Dr. & Mrs. Fred Stoker, Loughton: Berberis toluacensis?, Arctostaphylos Manzanita.

Mrs. Tracy, Wimborne: Ornithogalum chionophyllum, Leucocoryne ixioidcs odorata alba, Ranunculus asiaticus, Onosma fruticosum. Ingham Whitaker, Esq., Lymington: Prunus campanulata.

Mr. G. E. P. Wood, Ashtead: rock plants.

ORCHID COMMITTEE.

March 6, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and eighteen other members present.

Awards Recommended :--

Gold Medal. To Messrs. H. G. Alexander, Tetbury, for Cymbidiums.

Silver-gilt Banksian Medal.

To Messrs. McBean, Cooksbridge, for Cymbidiums.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Banksian Medal.

To Messrs. Black & Flory, Slough, for a group.

To Messrs. Sanders, St. Albans, for Cymbidiums.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

Vote of Thanks.

To Messrs. Stuart Low, Jarvis Brook, for a group. To Messrs. H. Dixon, Wandsworth, for a group.

First-class Certificate.

To Cymbidium × 'Cassandra' var. 'Betty' (votes II for, 2 against), from Messrs. H. G. Alexander (see p. 355).

Award of Merit.

To Dendrobium x 'Constance Wrigley' (votes 17 for, 1 against), from Miss Wrigley, Bridge Hall, Bury (see p. 356).

To Cymbidium x 'Jason' var. majesticum (votes 14 for, 2 against), from

Messrs. H. G. Alexander (see p. 355).

To Cymbidium × 'Profusion' (votes unanimous), from Messrs. McBean

(see p. 355).

To Cymbidium × Alexanderi var. 'Fantasy' (votes unanimous), from

Messrs. McBean (see p. 355).

To Cymbidium × 'Dingleden' (votes 14 for, 1 against), from Messrs. Stuart Low (see p. 355).

Preliminary Commendation.

To Odontoglossum x 'Viceroy' var. exquisitum ('crispo-Solon' x 'Victory') (votes unanimous), from Messrs. Armstrong & Brown. Flowers large, well formed, mahogany-red.

March 20, 1934, Sir Jeremiah Colman, Bt., in the Chair, and eighteen other members present.

Awards Recommended :-

First-class Certificate.

To Cymbidium × 'Apollo,' Exbury var. (votes 14 for, 3 against), from Lionel de Rothschild, Esq., Exbury (see p. 355).

Award of Merit.

To Cymbidium x 'Minivet,' Exbury var. (votes 16 for), from Lionel de Rothschild, Esq. (see p. 355).

To Odontioda × 'Seba' var. rubra (votes 12 for, 2 against), from Messrs.

Charlesworth, Haywards Heath (see p. 356).

To Cymbidium × 'Profusion' var. 'Ruby' (unanimous), from Messrs. Cooksbridge (see p. 355).

To Cymbidium × 'Thora' var. 'Rose Princess' (votes 13 for), from Messrs.

H. G. Alexander (see p. 356).

Preliminary Commendation.

To Odontoglossum x 'Plumptosolon,' Brockhurst var. ('crispo-Solon' x plumptonense) (votes unanimous), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. Flowers large and round, deep red-brown, the segments margined with white.

Cultural Commendation.

To Messrs. J. & A. McBean, Cooksbridge, for Laeliocattleya 'Eunice' var. albens (C. chocoensis × L. anceps), with five spikes and a total of eleven flowers. Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for Phalaenopsis Denevei var. aurea, an interesting species with terete leaves. The undulated sepals and petals

are golden-yellow shaded with brown towards the centre, while the labellum is marked with crimson. Native of Borneo.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sanders, St. Albans, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

To Messrs. H. G. Alexander, for a group.

To Baron Bruno Schröder, Englefield Green, for Cymbidiums.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

To Messrs. J. & A. McBean, Cooksbridge, for a group.

Sir William Cooke, Bt., Hampstead Norris, exhibited Odontoglossum × ' Athenia,' Wyld Court var.

April 4, 1934, F. J. HANBURY, Esq., in the Chair, and eleven other members present.

Awards Recommended :-

Award of Merit.

To Odontioda x 'Conchita' (votes 8 for, 1 against), from Messrs. Charlesworth (see p. 356).

Preliminary Certificate.

To Odonionia x 'Ephya' (Odontonia x Joiceyi x Odontoglossum crispum) (votes unanimous), from Messrs. Charlesworth. Flowers large, sepals and petals marked with red-brown on whitish, labellum blush pink with a large red-brown blotch at base.

Other Exhibits.

Messrs. Charlesworth, Haywards Heath: a group of Orchids.

Messrs. Stuart Low, Jarvis Brook: a group of Orchids. J. W. Read, Esq., Hockley, Essex: Dendrobium × 'Renown.'

M. L. Wells, Esq., Chiddingfold, Surrey: Odontoglossum x 'Theron.'

April 17, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen other members present.

Awards Recommended :--

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Award of Merit.

To Odontoglossum x 'Purple Queen' var. 'Eileen' (votes 13 for, 3 against), from Messrs. Charlesworth (see p. 356).

To Cymbidium × 'Phryne' var. 'Flamingo' (votes 15 for), from Messrs.

H. G. Alexander (see p. 355).

Other Exhibits.

Messrs. Sanders, St. Albans: group of Orchids.
Messrs. H. G. Alexander, Tetbury: group of Orchids.
Messrs. J. & A. McBean, Cooksbridge: group of Orchids.
Messrs. Armstrong & Brown, Tunbridge Wells: group of Orchids.

Messrs. Stuart Low, Jarvis Brook: group of Orchids. T. O. Stevens, Esq., West Byfleet: Brassocattleya × speciosa.

LIST OF DONATIONS TO THE SOCIETY'S GARDENS, 1933

ABERCONWAY, Lord, Tal-y-Cafn. Collection of seeds.

ADDY, G. C., Althorne, Essex. Grafts of Apple 'Mayland Orange Pippin.'

Allwood Bros., Messrs., Haywards Heath. Carnations and Dianthus for trial. Anderson, A. W., New Zealand. *Myosotidium nobile*. Anley, Mrs., Woking, Surrey. Seed of Pawpaw. Apps & Co., Messrs. A. E., London. Tagetes, Calendula, Spinach, Carrots, for trial.

ARMSTRONG, C. W., Vancouver, B.C. Viola for trial, and collection of seeds. ATLEE BURPEE Co., Messrs. W., Philadephia, U.S.A. Carrots, Spinach, Marigolds, Tagetes, for trial.

BAKER, G. P., Sevenoaks. Irises for trial, and Lobelia. BAKER, H. C., Almondsbury. Cyclamen balearicum, Cyclamen balearicum, Ceanothus rigidus var. grandifolius.

BAKERS, LTD., Messrs., Codsall. Lupines for trial.
BALCOMBE, W., Wokingham. Campanula Vidalii, Hibiscus diversifolius, Moraea iridioides var. Johnstoni, Sutherlandia frutescens.

Balfour, F. R. S., Dawyck, Scotland. Blue Bell from Siskiyou, Alpine Poppy. Ballard, E., Nr. Malvern. Aster for trial. Balls Expedition, Royal Botanic Garden, Edinburgh. Collection of seeds.

BARKER, E. J., Ipswich. Double Aubrietia for trial.

BARR & Sons., Messrs., Covent Garden, W.C. 2. Daffodils, Asters, Calendulas, Carrots, Spinach, Tagetes, for trial.

BARRES, DOMAINE DES, à Nogent-sur-Vernisson. Collection of seeds.

BARURSE, J. F., Burnley. Dahlia for trial.

BASSNETT, H., Tilehurst. Grafts of Quinces.

BATH, LTD., Messrs. R. H., Wisbech. Carrot, Daffodils, Chrysanthemums, for trial, and 2 cwt. of Daffodils; collection of Pæonies.

BEALE, P. T. B., Lymington. Crimum bulbs.

BEATTY, Earl, Reigate. Lupin for trial. BEAUCHAMP, Lady, Stroud, Glos. Rosa moschata.

BENARY, ERNST, Germany. Carrots, Spinach, for trial; and Cantaloup Melon

Bennett, A. H., British Columbia. Gymnogramme triangularis, Townsendia Wilcoxiana.

BERKELY, C., British Columbia. Iris sibirica × tenaz.

BLACKMORE & LANGDON, Messrs., Bath. Begonias for trial.

BODGER SEEDS LTD., Messrs., California. Marigolds, Calendulas, for trial.

BOIS, Mrs., Devon. "Foochow Creeper."

BONES, T., Cheshunt. Delphiniums, Asters, for trial.
BONN BOTANIC GARDEN, Germany. Gentiana thianshanica, Iris spuria.

Воотн, F. H. A., Chiddingfold. 2 plants of Labiate to name; and collection of plants.

Bowles, E. A., Waltham Cross. Iris aphylla.

Bradbury, W., Ipswich. Blackberry tips; unnamed Strawberry for trial.

BREMEN BOTANIC GARDEN. Collection of seeds.
BREWER, H., Maldon. "Squash" seeds, Apple' Maldon Wonder, for collection.
BRIDGEFORD, J. W., per Messrs. Watkins & Simpson, Covent Garden, W.C. 2.
Bulbs of Lilium Catesbaei, Geum coccineum 'Prince of Orange,' and collection

Brookside Nurseries, Ltd., Oxford. Saxifraga 'Cherry Trees,' Draba imbricata. Brown, F. C., Wisley. Iris Kaempferi spontanea, Iris laevigata, Iris tectorum, Ceanothus floribundus, Irises.

Brown, R., Pyrford, Surrey. Collection of plants.
Buckwell & Sons, Messis. A. A., St. Mary Cray. Dahlia for trial.
Bunyard, E. A., Maidstone. "Handbook of Hardy Fruits," "Apples and Pears and Stone and Bush Fruits, Nuts."

Bunyard & Co., Messrs. G., Maidstone. Carrots for trial, 12 cordon Apples 'Cox's Orange Pippin,' 12 cordon Pears 'Doyenne du Comice'; collection of Pears.

BURGOYNE, C., Chilworth. Seedlings of 'Kangaroo Paw.'

BURKWOOD & SKIPWITH, Ltd., Messrs., Kingston-on-Thames. Cytisus 'Geoffrey Skipwith.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

NOTICES TO FELLOWS.

The Fellowship of the Society is fast reaching the unprecedented figure of

30,000, and with very little effort this can be achieved this year.

Fellows and Associates are reminded that anyone elected to the Society between now and the close of the year will enjoy the privileges of Fellowship for the remainder of the year 1934, and will not be required to pay a further subscription until January 1, 1935.

FRUIT NAMING.

In the Apple and Pear season come numerous inquiries for naming these fruits. Fellows and Associates are reminded of the instructions for sending specimens for naming which, if followed, will considerably help the Committee

dealing with fruit.

Send at least three perfect specimens of a variety. Do not send until the fruits are mature, and then choose specimens representative of the particular variety. Avoid sending bruised, diseased, or abnormal fruits. Include with each variety a typical shoot with foliage. Number each variety, preferably by Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper and pack it carefully and securely in wood-wool or similar material. Flimsy cardboard boxes are usually crushed in the post, while scented-soap boxes taint the fruit and obscure the characteristic flavour. Give all the information possible respecting the age of the trees and how they are grown—e.g. indoors or out, as cordons, bushes, or standards, etc.

It is a convenience if specimens are sent so as to reach the office by the first

post of the morning of a show day.

PICTURES, PLANS, PHOTOGRAPHS, ETC.

With the approach of winter, space will be available at the Fortnightly Shows for pictures and photographs of plants, flowers, gardens, and plans or models of gardens. Regulations with regard to these exhibits may be had on application to the Secretary. The days of the Shows when these exhibits are permitted are November 6 and 27, December 11, 1934, January 8 and 22, and February 5 and 19, 1935.

HORTICULTURAL SUNDRIES.

Exhibition of Horticultural Sundries will likewise be allowed on November 27 and December 11, 1934, and January 8 and 22, 1935.

UNATTENDED EXHIBITS.

Attention is called to the rules for unattended exhibits. The Society's officers will, if necessary, unpack and stage small exhibits if the Secretary has been notified beforehand of their coming, and if the owner is unable to accompany them, but in no case can the Society undertake or be responsible for their repacking and return.

VOL. LIX. m

THE CALENDAR.

October 9, 1934.—Fortnightly Meeting and Show. Autumn-coloured Shrubs,

Chrysanthemums, and fruit are likely to form the chief exhibits.

In the evening at 5'clock the Lily Group will meet in the Restaurant of the Old Hall. There will be a discussion on "Lily Bulbs in a Dry State." Exhibits, photographs, or lantern slides bearing on the subject will be welcome. All Fellows are invited to attend.

ORCHID SHOW.

October 23 and 24, 1934.—Fortnightly Meeting and Show. This Show is primarily the Orchid Show of the year, and fine exhibits from amateurs as well as from the trade are usually staged. The following Challenge Cup and Trophies to be won outright, presented by the Orchid trade, will be competed for:

- (a) A Challenge Cup for the best group of Orchids in a space not exceeding 60 square feet, exhibited by an amateur who employs not more than three assistants in the Orchid houses, including the head gardener.
- (b) A Silver Trophy for the best twelve Orchids, not more than two of any one genus, exhibited by an amateur who employs not more than two growers, including the head gardener, in his Orchid houses.
 (c) A Silver Trophy for the best six Orchids exhibited by an amateur who
- employs not more than one Orchid grower or gardener.

Entries must be made on special forms obtainable from the Secretary, by whom the completed forms must be received not later than by the first post on the Wednesday preceding the Show, October 17, 1934.

Besides the Orchids, fine exhibits of Greenhouse and Stove plants, Chrysanthemums, berried shrubs, and fruit are likely to be displayed.

In the afternoon at 3.30 there will be a lecture in the Lecture Room of the New Hall by Captain R. C. H. Jenkinson on "Trees for the Small Park and Garden.'

Fellows and Associates who are interested in Bees and Honey will find in the Old Hall on October 22 and 23 an interesting exhibition of the Bee Keepers' Association. The Society's tickets will give admittance.

November 6, 1934.—Fortnightly Meeting and Show. At this time of the year exhibits from the open are necessarily few, and the displays of plants and flowers will come mainly from the greenhouse or the stove. Orchids, Carnations, Chrysanthemums and the like will be the attractive features of the New Hall; Apples and Pears are sure to be found on the benches. At this Show there will be exhibits of pictures, photographs, and plans, etc.

In the afternoon at 3.30 the Institute of Landscape Architects will hold

their Annual Meeting in the Lecture Room.

November 8 and 9, 1934.—By arrangement with the National Chrysanthemum Society our Fellows will be admitted free to the Show of Chrysanthemums to be held in the New Hall on November 8 and 9.

November 14 and 15, 1934.—Practical Demonstration on Planting Fruit Trees

and Roses at Wisley (weather permitting).

The Fellows have shown their appreciation of these practical demonstrations held from time to time throughout the year; and those intending to be present are asked to notify the Director of the Gardens, Wisley, Ripley, Surrey, of their intention so that he may arrange for their comfort.

November 20 and 21.—Fellows' and Associates' tickets will admit to the Show of the British Carnation Society, which will be held in the Old Hall on November 20 and 21.

November 27, 1934.—Fortnightly Meeting and Show. Like all the Winter Shows, and until the turn of the year when forced bulbs make their appearance, plants and flowers from the greenhouse must necessarily dominate. Orchids, Chrysanthemums, and fruit are likely to be good and interesting.

In the Lecture Room in the New Hall at 3.30 P.M., Dr. RENDLE, F.R.S., V.M.H., Professor of Botany to the Society, will lecture on "My Visit to Bermuda," which will be illustrated with a number of interesting slides.

Conferences.

The preliminary programme of the Daffodil Conference to be held from April 16 to 19, 1935, has now been settled. It will include papers on the following subjects: "Daffodils—Past and Present"; "Daffodil Species"; "Daffodil Trials"; "Preparation for Forcing"; "Breeding"; "Commercial Cultivation"; and "Diseases and Pests."

Excursions to Wisley, Spalding, and Holbeach will be arranged.

The Report of the Conference will be published in the Daffodil Year Book for 1935.

Full particulars of the Conference are obtainable from the Secretary.

R.H.S. GARDENS, WISLEY.

Of the trials of a permanent character at their best at Wisley, Michaelmas Daisies (Asters) will be foremost, and so long as frost permits Dahlias will also be of great interest. These trials are near the main entrance.

The Exhibition Fruit Room will contain examples of fruits of Apples and Pears from the very large collection in the Fruit trial grounds, of both old and

new varieties. The Exhibition Room is near the Aster trial ground.

The Heath garden, in Seven Acres, which always contains plants in flower, will still be bright with the autumn-flowering Heaths, and in the same area numbers of shrubs and trees with coloured foliage should be at their best. The masses of colour provided by the great collection of Barberries themselves make this part of the Garden worthy of a visit in October and November.

PUBLICATIONS.

The "R.H.S. Gardeners' Diary" now appears for the twenty-fourth year, which vouches for its usefulness and popularity. In addition to the usual necessary information so important to all gardeners, space has been found for notes on Antirhinum Rust and Celery Spot Disease, as well as short garden notes on Rhododendrons, Auriculas, and Border Carnations. Copies may be obtained from the Secretary or any bookseller, price 2s. in cloth, 5s. in leather refillable case. Refills 1s. 6d. Postage 2d. a copy.

The Daffodil Year Book, 1934, is now published. Price 5s. stiff covers,

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The Lily Year-Book, 1934, will be published in October.

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GENERAL MEETINGS.

MAY 8, 1934.

Sir Daniel Hall, K.C.B., LL.D., Sc.D., F.R.S., in the Chair.

The first Masters Memorial Lecture was given by Dr. W. F. Bewley on

"Health and Disease in Plants" (see p. 386).

A discussion on "Fritillaries" was opened by Mr. P. Rosenheim and Mr. G. P. BAKER, V.M.H., under the chairmanship of Mr. F. C. STERN, F.L.S. An epitome of this Discussion will appear in the Lily Year-Book, 1934.

MAY 9, 1934.

Mr. A. D. COTTON, F.L.S., in the Chair.

The second Masters Memorial Lecture was given by Dr. W. F. Bewley on "Health and Disease in Plants" (see p. 386).

CHELSEA SHOW.

MAY 30, 31 AND JUNE 1, 1934.

Held in the Grounds of the Royal Hospital, Chelsea.

The following accepted the Council's invitation to assist in judging the exhibits:-

EXHIDITS:—

H. G. ALEXANDER, V.M.H.; D. ALLAN; G. P. BAKER, V.M.H.; W. G. BAKER; F. R. S. BALFOUR; N. F. BARNES, V.M.H.; W. J. BEAN, I.S.O., V.M.H.; A. BEDFORD; Rev. CANON A. T. BOSCAWEN, V.M.H.; E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H.; D. CAMPBELL; E. H. CHRISTY; A. W. COATES; C. H. COOK; R. E. COOPER; A. D. COTTON, F.L.S.; J. COUTTS, V.M.H.; The Rt. Hon. The Earl of CRAWFORD & BALCARRES, P.C., K.T.; C. H. CURTIS, F.L.S., V.M.H.; H. R. DARLINGTON, M.A., F.L.S.; A. DAWKINS; A. G. ELLWOOD; R. S. FARDEN; MARK FENWICK; J. E. FIIT; F. GALSWORTHY; W. HALES, A.L.S.; The Marquess of HEADFORT; D. INGAMELLS; The Hon. ROBERT JAMES; A. J. JONES; F. JORDAN, V.M.H.; A. MCBEAN; E. PRENTICE MAWSON, F.I.L.A.; A. MERRY; A. W. METCALFE; SIT FREDERICK MOORE, M.A., F.L.S., V.M.H.; JOHN NASH; H. OPPENHEIMER; G. L. PILKINGTON; F. G. PRESTON; F. C. PUDDLE; C. P. RAFFILL; V. L. ROSCOE; LIONEL DE ROTHSCHILD, O.B.E., V.M.H.; F. A. SECRETT, F.L.S.; H. SMITH; F. C. STERN, F.L.S.; T. STEVENSON; Dr. FRED STOKER, F.L.S.; C. C. TITCHMARSH, N.D.H.; E. H. WILDING; Dr. A. H. WILLIAMS; G. H. WRIGHT.

LIST OF AWARDS.

The Sherwood Cup, for the most meritorious exhibit in the show. To Messrs. Carters' Tested Seeds, Raynes Park, S.W., for florists' flowers.

The Cain Cup, for the best exhibit shown by an amateur.

To Lionel de Rothschild, Esq., Exbury, for Hippeastrum hybrids.

The Orchid Challenge Cup, for the best group of orchids shown by an amateur in a space not exceeding 60 square feet.

To M. L. Wells, Esq., Chiddingfold (gr. Mr. R. Buckman).

The Sutton Vegetable Cup, for the best group of vegetables shown by an

To Cheadle Royal Mental Hospital, Cheadle, for vegetables.

The Orchid Trophy, for the best six orchids exhibited by an amateur.

To T. O. Stevens Perry, Esq., West Byfleet.

To Dartington Hall, Ltd., Totnes, for rock garden.

To Mr. G. G. Whitelegg, Chislehurst, for rock garden.

To Messrs. Blackmore & Langdon, Bath, for mixed group of Begonias, Delphiniums and Gloxinias.

To Messrs. R. Wallace, Tunbridge Wells, for mixed group of Lilies and other bulbous plants, Rhododendrons, etc.

To Messrs. Sutton, Reading, for vegetables.

To Lionel de Rothschild, Esq., O.B.E., V.M.H. (Orchid grower, Mr. B. Hills), Exbury, for Orchids.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Orchids.

To Messrs. Charlesworth, Haywards Heath, for Orchids.

- To Messrs. McBean, Cooksbridge, for Orchids.
 To Messrs. Carters' Tested Seeds, Raynes Park, S.W., for florists' flowers.
 To Lionel de Rothschild, Esq., O.B.E., V.M.H. (gr. Mr. A. Bedford), Exbury, for Hippeastrum hybrids.

To Messrs. Sutton, Reading, for greenhouse plants from seeds. To Messrs. A. Charlton, Rotherfield, for trees and shrubs, including Japanese Maples.

To Messrs. Hillier, Winchester, for trees and shrubs.

To Messrs. R. Bolton, Birdbrook, for Sweet Peas.

To Messrs. Dobbie, Edinburgh, for Sweet Peas.
To The Lord Aberconway, C.B.E., Bodnant, Tal-y-Cafn, N. Wales (gr. Mr. F. C. Puddle), for alpines, including Primulas, Meconopsis, and Rhododendrons. To Messrs. Allwood, Haywards Heath, for mixed group of Carnations and Pinks.

To Messrs. C. Engelmann, Saffron Walden, for Carnations.

Silver Cup.

To Messrs. Clarence Elliott, Stevenage, for rock garden. To Hocker Edge Gardens, Cranbrook, for rock garden.

To Messrs. Waterer, Sons & Crisp, Bagshot, for hardy Rhododendron hybrids.

To Messrs. Barr, Covent Garden, for Tulips and bulbous Irises.

To Messrs. Laxton, Bedford, for Strawberries.
To Messrs. H. G. Alexander, Tetbury, for Orchids.
To Messrs. Black & Flory, Slough, for Orchids.
To Messrs. the Donard Nursery Co., Newcastle, Co. Down, for shrubs.

To Messrs. G. Jackman, Woking, for Clematis. To Messrs. R. Wallace, Tunbridge Wells, for garden.

To Messrs. Alex. Dickson, Newtownards, for Roses.

Silver-gilt Flora Medal.

To Mr. A. Gavin Jones, Letchworth, for rock garden.

To Messrs. Dobbie, Edinburgh, for Tulips.

To Messrs. Bees, Chester, for herbaceous and rock-garden plants.

To Mr. Amos Perry, Enfield, for ferns, aquatics, tree Pæonies and bulbous plants.

To Messrs. G. Bunyard, Maidstone, for Irises.

To F. C. Stern, Esq., F.L.S., Goring-by-Sea, for Irises.

To Sir Jeremiah Colman, Bt., V.M.H. (Orchid grower, Mr. B. F. Perfect), Reigate, for Orchids.

To F. J. Hanbury, Esq., F.L.S., V.M.H. (Orchid grower, Mr. S. Farnes), East Grinstead, for Orchids.

To Messrs. Sanders, St. Albans, for Orchids.

To Baron Bruno Schröder (gr. Mr. E. J. Henderson), Englefield Green, for Hippeastrum hybrids.

To Messrs. L. R. Russell, Richmond, Surrey, for stove and greenhouse plants.

To Dartington Hall, Ltd., Totnes, for trees and shrubs. To Mr. R. C. Notcutt, Woodbridge, for shrubs, including Lilacs and Brooms.

To Percy S. Cane, Esq., 2 Westminster Palace Gardens., S.W. 1, for garden. To Messrs. W. H. Gaze, Kingston-on-Thames, for formal garden. To Mr. James MacDonald, Harpenden, for grass garden.

To Messrs. J. Waterer, Sons & Crisp, Bagshot, for formal garden.
To Messrs. Frank Cant, Colchester, for Roses.
To Messrs. J. Waterer, Sons & Crisp, Twyford, for herbaceous plants. Silver-gilt Banksian Medal.

To Messrs. Bakers, Codsall, for rock garden. To Messrs. W. E. Th. Ingwersen, East Grinstead, for rock garden.

To Messrs, the Knap Hill Nursery, Woking, for hardy Rhododendron and Azalea hybrids.

- To Messrs. R. H. Bath, Wisbech, for Tulips and other bulbous plants. To Messrs. Wakeley, Bankside, S.E., for Tulips.
 To Messrs. the Orpington Nurseries, Orpington, for Irises.
 To Mr. T. M. Endean, Laindon, for Cacti and Succulents. To Messrs. Neale, Newhaven, for Cacti and Succulents.

To C. G. Osborne, Esq. (gr. Mr. J. E. Jones), Marlow-on-Thames, for Orchids. To M. L. Wells, Esq. (gr. Mr. R. Buckman), Chiddingfold, for Orchids. To Messrs. Stuart Low, Jarvis Brook, for Orchids.

To Mr. A. Dawkins, 408 King's Road, S.W. 10, for mixed group of Schizanthus and Cinerarias.

To Messrs. John Peed, West Norwood, S.E. 27, for greenhouse plants.

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To Messrs. E. Webb, Stourbridge, for flowering plants from seeds.

To Messrs. J. Cheal, Crawley, for trees and shrubs.

To Messrs. Hillier, Winchester, for trees and shrubs.

To Messrs. Hollamby's Nurseries, Groombridge, for trees and shrubs. To Mr. R. C. Notcutt, Woodbridge, for trees and shrubs.

To Messrs. the Pixham Grove Nurseries, Dorking, for trees and shrubs.

To Messrs. G. Reuthe, Heston, for mixed group of Rhododendrons and other shrubs.

To Messrs, the Walton Park Nurseries, Walton-on-Thames, for shrubs and Conifers.

To Messrs. J. Cheal, Crawley, for formal garden.

To Mr. Elisha J. Hicks, Reading, for Roses. To Messrs. M. Prichard, Christchurch, for herbaceous plants.

To Messrs. Casburn, Bedford & Page, Trumpington, for rock-garden plants.

To Messrs. Clarence Elliott, Stevenage, for rock-garden plants.

To Messrs. M. Prichard, for rock-garden plants.

Silver-gilt Knightian Medal.

To the Cheadle Royal Mental Hospital (gr. Mr. E. C. Mason), Cheadle, for vegetables.

To Messrs. Fogwills, Guildford, for vegetables.

Silver-gilt Grenfell Medal.

To the Hon. Mrs. R. Boyle, Pulborough, for paintings of trees, shrubs, flower borders, and wild flowers.

To Miss M. I. Greenfield, Lindfield, for paintings of Orchids. To Mrs. A. C. Reeve-Fowkes, Eastbourne, for paintings of flowers.

Silver Flora Medal.

To Mr. G. G. Whitelegg, Chislehurst, for Azaleas. To Messrs. J. R. Pearson, Lowdham, for Tulips. To Mr. W. A. Constable, Tunbridge Wells, for mixed group of Lilies, Tulip species, Hardy Cypripediums, etc.

To Messrs. Daniels, Norwich, for Tulips.

To W. G. Theobald, Esq. (gr. Mr. R. Baker), Steyning, for Cotyledons and Echeverias.

To Messrs. L. R. Russell, Richmond, Surrey, for hardy and half-hardy trees and shrubs.

To Messrs. L. R. Russell, Richmond, Surrey, for trees and shrubs.

To Messrs. J. Burley, Putney, S.W. 15, for garden.

To Messrs. Gilliam, Croydon, for garden.
To Messrs. Toogood, Southampton, for Stocks.
To Messrs. Watkins & Simpson, Drury Lane, W.C., for mixed group of Calceolarias, Ranunculus and Stocks.

To Messrs. Bakers, Codsall, for Delphiniums, Lupins and Trollius. To Messrs. Clarence Elliott, Stevenage, for trough gardens.

To Mr. G. E. Welch, Cambridge, for rock-garden plants. To Lady Carr (gr. Mr. J. T. Doe), Walton-on-Hill, for Carnations. To Mr. James Douglas, Great Bookham, for border Carnations.

Silver Banksian Medal.

To Rev. H. Rollo Meyer, Watton-at-Stone, for Tulips. To Mr. E. Ladhams, Elstead, for shrubs and herbaceous plants.

To Messrs. Wm. Wood, Taplow, for herbaceous and rock-garden plants. To Messrs. Stuart Low, Enfield, for Australian shrubs, Hippeastrums and

other greenhouse plants.

To Messrs. Burkwood & Skipwith, Kingston, for trees and shrubs. To Mr. W. J. Marchant, Stapehill, Wimborne, for trees and shrubs. To Messrs. R. Veitch, Alphington, nr. Exeter, for trees and shrubs.

To Messrs. R. Gill, Falmouth, for Rhododendrons and other shrubs.

To Messrs. Ben. R. Cant, Colchester, for Roses.

To Messrs. Barr, Covent Garden, W.C. 2, for mixed group of herbaceous and bulbous plants.

To Messrs. Carter Page, London Wall, E.C. 2, for Dahlias.

To Messrs. C. Engelmann, Saffron Walden, for Pansies.

To Messrs. Hewitt, Solihull, for mixed group of Delphiniums, Thalictrum and other herbaceous plants.

To Messrs. the Highfield Nursery Co., Enfield, for Violas. To Mr. Stuart Ogg, Swanley, for Dahlias.

To Messrs. M. Prichard, Christchurch, for herbaceous plants.

To Messrs. the Suffolk Seed Stores, Woodbridge, for herbaceous plants. To Messrs. Casburn, Bedford & Page, Trumpington, for trough gardens.

- To Mr. G. H. Dalrymple, Southampton, for mixed group of Primulas and
 - To Messrs. the Hocker Edge Gardens, Cranbrook, for alpine-house plants.

To Mr. A. Gavin Jones, Letchworth, for rock-garden plants. To Messrs. J. Waterer, Sons & Crisp, Twyford, for rock-garden plants.

Silver Hogg Medal.

To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

Silver Knightian Medal.

- To The Rt. Hon. Lord Riddell, P.C. (gr. Mr. A. Payne), Tadworth, for vegetables.
 - To The Sussex Nurseries, Rustington, for vegetables.

Silver Grenfell Medal.

To Miss F. L. Bunyard, Rye, for water-colour paintings of flowers.

To Miss E. Savory, Chertsey, for paintings of flowers.

To Captain F. Kingdon Ward, V.M.H., Harlington, for hand-painted enlargements of Finlay colour transparencies of Tibetan plants taken in Tibet in 1933.

Flora Medal.

To Messrs. Pulham, 71 Newman Street, W. 1, for rock garden.

To Mr. J. C. Allgrove, Langley, for herbaceous plants, shrubs and trees. To Messrs. Pennell, Lincoln, for Statice, Lilacs and Clematis.

To Mr. G. G. Whitelegg, Chislehurst, for Irises.

To Mr. H. J. Jones, Lewisham, for Hydrangeas.

To Messrs. the En-Tout-Cas Co. (Syston), Syston, for Conifers. To Messrs. D. Stewart, Wimborne, for Rhododendrons, Azaleas and other shrubs.

To Studley College, Warwickshire, for Godetias.

To Messrs. C. Engelmann, Saffron Walden, for Zinnias.

- To Messrs. Kelway, Langport, for Pæonies, Pyrethrums and Delphiniums.
- To Messrs. the Brookside Nurseries, Oxford, for rock-garden plants. To Messrs. Dartington Hall, Ltd., Totnes, for rock-garden plants. To Messrs. G. Reuthe, Keston, for rock-garden plants.

Banksian Medal.

To Mr. Geo. H. Cuthbert, Ferndown, for Azaleas.

To Messrs. C. Engelmann, Saffron Walden, for mixed group of Gerbera and Sempervivums.

To Messrs. H. Dixon, Wandsworth Common, S.W., for Orchids. To Messrs. Mansell & Hatcher, Rawdon, for Orchids.

To R. van B. Emmons, Esq. (gr. Mr. M. L. Forster), Hamble, for Hippeastrum hybrids.

To Mrs. J. T. Wigan (gr. Mr. W. G. Todd), Chelmsford, for Schizanthus, Pelargoniums and Coleus hybrids.

To Mr. John Klinkert, Richmond, S.W., for Topiary.

- To Messrs. T. Yano, 9 Granville Place, W. 1, for Japanese dwarf trees and shrubs.
- To Messrs. the Yokohama Nursery Co., Kingsway, W.C. 2, for Japanese dwarf trees.
 - To Messrs. the Knaphill Nursery, Woking, for shrubs.

To Mr. E. Dixon, Putney, S.W. 18, for garden. To Messrs. Allen, Norwich, for Roses.

To Messrs. J. C. Allgrove, Langley, for Rosa Hugonis. To Messrs. Chaplin, Waltham Cross, for Roses. To Messrs. Wm. Cutbush, Barnet, for Roses.

To Messrs. George Prince, Longworth, for Roses.

To Messrs. Wheatcroft, Nottingham, for Roses.

To Messrs. Dobbie, Edinburgh, for Nasturtiums.

To Messrs. W. H. Simpson, Birmingham, for Antirrhinums.

To Messrs. W. J. Unwin, Histon, for Nasturtiums.

To Messrs. W. Artindale, Sheffield, for Eremurus, Trollius and other herbaceous plants.

To Mrs. D. Bucknall, Doneraile, for *Habranthus pratensis*. To Mr. E. Clegg, Dewsbury, for Violas and Pansies. To Mr. G. R. Downer, Chichester, for Lupins.

To Messrs. Redgrove & Patrick, Sevenoaks, for herbaceous plants.

- To Mr. J. B. Riding, Chingford, E. 4, for Dahlias.
 To Mr. H. Woolman, Shirley, for Dahlias.
 To Mr. W. Yandell, Maidenhead, for Violas.
 To Messrs. W. E. Th. Ingwersen, East Grinstead, for rock-garden plants.

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To Mr. H. G. Longford, Abingdon, for rock-garden plants.

To Messrs. W. H. Rogers, Southampton, for rock-garden plants. To Mr. W. Wells, jun., Merstham, for rock-garden plants.

To Messrs. Bowell & Skarratt, Cheltenham, for rock-garden plants.

To Messrs. J. Robinson, Eltham, S.E. 9, for rock-garden plants. To Messrs. Stuart Low, Enfield, for Carnations.

To Messrs. Keith Luxford, Sawbridgeworth, for Carnations.

To Dr. E. P. Andreae (gr. Mr. B. Gray), Oxted, for Gloxinias and Streptocarpus. Lindley Medal.

To Messrs. Hillier, Winchester, for Rose species.

Grenfell Medal.

To Miss I. M. Charters, Leicester, for paintings of plants, flowers and gardens, and drawings of plants and flowers.

To Mrs. Charles Grey, Cranbrook, for drawings of plants.

To Miss Anne Lawrence, Burford, for paintings and drawings of flowers.

To Miss B. A. Matchwick, Reigate, for water-colour paintings of flowers and fruit.

To Mrs. M. R. Oddie, Uckfield, for paintings of flowers and gardens.

To Miss D. Ratman, 46 Belgrave Road, S.W. 1, for water-colour paintings of flowers.

To Mrs. Norman Stone, Cranleigh, for water-colour paintings of flowers. To Miss W. Walker, 24 Tanza Road, N.W. 3, for paintings of flowers. To Miss J. N. Williams, 1 Oakley Studios, S.W. 3, for drawings of seed vessels.

SCIENTIFIC COMMITTEE.

May 8, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and six

other members present.

Plants for identification.—Three Fritillaries were referred from the Floral Committee B, two of which were F. pontica, and the third sent as F. glacialis proved to be F. gracilis. A form of Iris unguicularis flowering late proved to be the variety lazica.

Iris Grant Duffii, referred to the Committee from the Iris Committee and shown by Mr. F. C. Stern, was found to be the var. Aschersonii, and to it a Botanical

Certificate was recommended.

Ajuga hybrid.—Mr. Fraser showed a hybrid between A. reptans and A.

pyramidalis from Co. Clare.

Flowers from Korea.—A series of paintings of Korean flowers was shown by Dr. Hurst and left for naming. They had been made in Korea by a lady missionary.

Buddleia asiatica and a species of Hypericum from Mt. Ruwenzori with scarlet and yellow flowers were shown by Major Johnson from his garden at Chipping Campden.

FRUIT AND VEGETABLE COMMITTEE.

May 8, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fifteen other members present.

The business before the Committee consisted of fruits for identification.

May 29, 1934, CHELSEA SHOW. Mr. E. A. BUNYARD, F.L.S., in the Chair, and twenty-one other members present.

There was no business before the Committee on this occasion.

FLORAL COMMITTEE A.

May 8, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Carter, Raynes Park, for Cinerarias, Lilies and Freesias.

Silver Flora Medal.

To Messrs. Dobbie, Edinburgh, for Schizanthus. To Mr. J. Douglas, Great Bookham, for Auriculas.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Sander, St. Albans, for Anthuriums.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Army Vocational Training Centre, Chisledon, for Hippeastrums.

To Messrs. B. R. Cant, Colchester, for Roses. To Messrs. F. Cant, Colchester, for Roses. To Mr. G. H. Dalrymple, Bartley, for Auriculas.

Flora Medal.

To Messrs. Pennell, Lincoln, for Clematis and Statice. To Messrs. Toogood, Southampton, for Clarkias, Schizanthus and Stocks.

Banksian Medal.

To Messrs. Barr, London, for Irises, etc.
To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
To Messrs. Engelmann, Saffron Walden, for Carnations, Pansies.

To Messrs. Carter Page, London, for Dahlias. To Messrs. Simmons, Finchley, for Violas.

To Swanley Horticultural College, Swanley, for Schizanthus. To Messrs. Watkins & Simpson, London, for Calceolaria 'Albert Kent Improved.'

To Mr. G. E. P. Wood, Ashtead, for Violas, Anemones and other hardy plants.

Selected for trial at Wisley.

Calceolaria 'Albert Kent Improved,' from Messrs. Watkins & Simpson, London.

Nasturtium 'Gleam Hybrids' Nasturtium 'Scarlet Gleam' from Messrs. Dobbie, Edinburgh.

The following awards were made after trial at Wisley:

Award of Merit.

To Aubrietia 'Barker's Double,' from Mr. J. E. Barker, Ipswich (see p. 399). To Calceolaria multiflora nana, from Messrs. Carter, Raynes Park (see p. 399).

Other Exhibits.

Messrs. Carter, Raynes Park: Cineraria 'Starfish.' Messrs. J. & A. H. Crook, Beaconsfield: Polyanthus.

Dean Gardens, Longniddry: Primroses and Polyanthus. Mrs. G. Ferrier, Ripon: Polyanthus 'Arthur Edwards.'

Mrs. A. Fremantle, Penn: Primroses and Polyanthus.

Messrs. Gibson, Leeming Bar: Auriculas.

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Mr. D. Gidlow, Paddock Wood: Rose 'Princess of Orange.' Rev. H. Rollo Meyer, Watton-at-Stone: Muscari 'Cantab.' Messrs. Sander, St. Albans: Anthurium Rothschildianum 'Pharaoh.'

Mrs. Sherbrooke, Brockenhurst: Polyanthus 'Bear Ground.'

Messrs. Stark, Fakenham: Polyanthus.

May 29, 1934, at Chelsea, Mr. G. W. LEAK, V.M.H., in the Chair, and twentythree other members present.

Awards Recommended :-

Award of Merit.

To Geum 'Prince of Orange' for the herbaceous border and cutting (votes unanimous), from Messrs. Watkins & Simpson, London (see p. 401).

Selected for trial at Wisley.

Dianthus Allwoodi 'Daphne' from Messrs. Allwood, Haywards Dianthus 'Double Sweet Wivelsfield' Heath

Digitalis ' Dobbie's Hybrids,' from Messrs. Dobbie, Edinburgh. Nasturtium 'Semi Double Fusilier,' from Messrs. Hurst, London. Nasturtium 'Scarlet Gleam,' from Messrs. Carter, Raynes Park.

Other Exhibits.

Mesrs. B. R. Cant, Colchester: Climbing Rose 'Red Emperor.' Messrs. Dickson, Edinburgh: Rose 'Hazel Alexander.' Messrs. Hayward, Clacton-on-Sea: Dianthus.

Messrs. Hillier, Winchester: Rose 'Climbing Little Dorrit.'

A. Hosking, Esq., Guildford: Anchusa italica 'Stella.'
Messrs. Kelway, Langport: Tree Pæony 'King George V.' and Pyrethrum 'Kelway's Glorious.'

Mr. H. G. Longford, Abingdon: Dianthus 'Abingdon Hybrid.'

Messrs. Scott, Merriott: Chrysanthemum 'Mignon.

Colonel R. Sneyd, Stoke-on-Trent: Zonal Pelargonium 'Keele Novelty.'

Suffolk Seed Stores, Woodbridge: Pyrethrums.

FLORAL COMMITTEE B.

May 1, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

First-class Certificate.

To Clematis indivisa lobata, Stead's Variety, as a tender flowering shrub (votes 6 for), from Lord Aberconway, Bodnant (see p. 400).

Award of Merit.

To Antholyza intermedia as a flowering plant for the cold house (votes 8 for), from T. Hay, Esq., Hyde Park, London, W. (see p. 399).

To Camellia 'Adolphe Audusson' as a hardy flowering shrub (votes unanimous), from Sir John F. Ramsden, Bt., Gerrards Cross (see p. 399).

To Meconopsis quintuplinervia as a hardy flowering plant (votes unanimous),

from T. Hay, Esq., Hyde Park (see p. 401).

To Primula Wigramiana as a hardy flowering plant (votes unanimous), from

T. Hay, Esq., Hyde Park (see p. 402).

To Prunus 'Okiku Zakura' as a hardy flowering tree (votes 8 for), from

Collingwood Ingram, Esq., Benenden (see p. 402).

To Viola pedata bicolor as a hardy flowering plant for the rock garden and alpine house (votes 10 for), from Lt. Col. C. H. Grey, Hocker Edge Gardens, Cranbrook (see p. 405).

Preliminary Commendation.

To Teucrium fruticans var. angustifolium (votes unanimous), from Collingwood Ingram, Esq., Benenden.

Other Exhibits.

Lord Aberconway, Bodnant: Primula brevifolia, P. chlorodryas. Miss A. R. Baring, Chandlersford: Polyanthus' Snowstorm.'

Messrs. Burkwood & Skipwith, Kingston-on-Thames: × Osmarea Burkwoodii.

Messrs. Daniels, Norwich: Ribes 'Daniels' New Giant White.'

Lt.-Col. C. H. Grey, Cranbrook: Calanthe tricarinata.

Messrs. Hillier, Winchester: Cassiope lycopodioides.

Collingwood Ingram, Esq., Benenden: Prunus Webbii, Gladiolus flavidus

× G. revolutus, Auricula seedling.

Lady Loder, Horsham: Skimmia rubella.

May 8, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. G. G. Whitelegg, Chislehurst, for Rhododendrons.

Silver Banksian Medal.

To Messrs. J. Cheal, Crawley, for flowering shrubs.

To Messrs. M. Prichard, Christchurch, for alpine plants. To Messrs. R. Wallace, Tunbridge Wells, for Rhododendrons.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston, for flowering shrubs.

To Messrs. C. Elliott, Stevenage, for alpine plants in pans.

To Mr. Gavin Jones, Letchworth, for alpine plants.

To Mr. E. Ladhams, Elstead, for alpine and herbaceous plants.

To Messrs. Neale, Newhaven, for succulents.
To Messrs. L. R. Russell, Richmond, for flowering shrubs.
To Messrs. Waterer, Sons & Crisp, Twyford, for alpine plants.

Award of Merit.

To Androsace arachnoidea var. superba as a flowering plant for the rock garden (votes 13 for, 1 against), from Messrs. C. Elliott, Stevenage (see p. 399).

To Doryanthes Guilfoylei as a flowering plant for the greenhouse (votes 11 for, 1 against), from the Rt. Hon. Lord Rothschild, Tring Park, Tring (see p. 400).

To Paeonia Delavayi as a hardy flowering plant (votes 14 for), from F. C.

Stern, Goring-by-Sea (see p. 402).

To Rosa Lawranceana 'Oakington Ruby' as a flowering shrub for the rock garden (votes 14 for), from Messrs. C. H. Bloom, Oakington, Cambs (see p. 404).

Preliminary Commendation. To Campanula sp. E.K.B. 417 as a flowering plant for the rock garden (votes

unanimous), from Frank Barker, Esq., Stevenage. To Viola labradorica as a hardy flowering plant (votes 8 for, 5 against), from

Cultural Commendation.

To Mr. S. Capon, gardener to the Duke of Richmond and Gordon, Goodwood Park, for cut flowers of Richardia Pentlandii.

To Maytham Gardens, Rolvenden, for Veronica Hulkeana.

Other Exhibits.

Alpine Nurseries, West Moors: alpine plants.

Viscountess Byng of Vimy, Thorpe-le-Soken.

G. P. Baker, Esq., Sevenoaks: Prunus prostrata, Lithospermum oleaefolium, Fritillaria pontica.

Messrs. Baker, Codsall: alpine plants and shrubs.

Messrs. Bloom, Oakington: Rosa species. Viscountess Byng of Vimy, Thorpe-le-Soken: Oenothera ovata.

Messrs. Caldecott & Claremount: flowering shrubs. Chez Nous Nurseries, Newick: alpine plants.

Mrs. F. H. Cook, Wonersh: Echium fastuosum.

Messrs. Elliott, Stevenage: Douglasia laevigata.

Lt.-Col. C. H. Gray, Cranbrook: Fritillaria liliiflora, Lachenalia tricolor, Calypso japonica, Calanthe tricarinata, Liparis liliifolia.

Messrs. Hemsley, Crawley: flowering shrubs.
Misses Hopkins, Coulsdon: rock plants.
Collingwood Ingram, Esq., Benenden: Prunus Mugus.
Mr. Algernon Kench, Weybridge: alpine plants in pans.

The Director, Royal Botanic Gardens, Kew: Rhodohypoxis Baurii, R. Baurii platypetala.
Knap Hill Nursery Co., Woking: Paeonia macrophylla.
Mr. B. Ladhams, Southampton: shrubs and hardy plants.

Messrs. Maxwell & Beale, Broadstone: alpine plants and shrubs.

Lt.-Col. L. C. R. Messel, Handcross: Epacris impressa var. ceraeflora. Mr. R. C. Notcutt, Woodbridge: Prumus serrulaia 'Hozakawabeni.' Messrs. Redgrove & Patrick, Sevenoaks: alpine plants and shrubs. The Duke of Richmond and Gordon, Chichester: Ercilla spicata.

Mr. J. Robinson, Eltham: alpine plants and shrubs.

Messrs. W. H. Rogers, Southampton: alpine plants and shrubs.

Major F. C. Stern, Goring-by-Sea: Fritillaria libanolica, F. pyrenaica, F. glacialis, F. pyrenaica lutea.

Messrs. Stuart Low, Enfield: Gardenia 'Mystery.'

E. K. Wilson, Esq., Wimbledon: Fothergilla major, Cornus Nuttallii, Azara Gilliesii.

May 29, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-eight other members present.

Awards Recommended :-

First-class Certificate.

To Paeonia 'Hakugan' as a hardy flowering plant (votes 11 for, 5 against), from G. W. E. Loder, Esq., Ardingly (see p. 402).

Award of Merit.

To Aquilegia longissima as a hardy flowering plant (votes 17 for), from Messrs. Watkins & Simpson, Drury Lane, W.C. 2, and Messrs. C. Elliott, Stevenage (see p. 399).

To Campanula Andrewsii as a flowering plant for the rock garden and alpine house (votes 12 for, 4 against), from F. J. Hanbury, Esq., East Grinstead (see

To Corokia Cotoneaster as a hardy flowering shrub (votes 18 for), from Lord

Aberconway, Bodnant (see p. 400).

To Crataegus 'Cheal's Crimson' as a hardy flowering tree (votes 17 for, 1 against), from Messrs. J. Cheal, Crawley (see p. 400).

To Homeria aurantiaca as a tender flowering plant (votes 14 for), from Colling-

wood Ingram, Esq., Benenden (see p. 401).

To Paulownia imperialis as a hardy flowering tree (votes 14 for), from Lord

Horder, Petersfield, and F. J. Hanbury, Esq., East Grinstead (see p. 402).

To Saxifraga 'Kathleen Pinsent' as a flowering plant for the rock garden and alpine house (votes 12 for), from Messrs. C. Elliott, Stevenage (see p. 404).

To Telopea truncata as a flowering shrub for the greenhouse (votes unanimous), from the Hon. Mrs. Sebag Montefiore, Plymouth (see p. 405).

Preliminary Commendation.

To Meconopsis sp. McL. 186 (votes unanimous), from Lord Aberconway,

To Primula pulchella (votes 10 for, 6 against), from the Hon. Mrs. Sebag Montefiore, Plymouth.

Other Exhibits.

Canon A. T. Boscawen, Ludgvan: Camellia fimbriata 'Kaiyo Tsubaki.'

Sir Jeremiah Colman, Bt., Gatton Park: Pentstemon sp. C.E. 728. Dorset Nurseries, Blandford: Anagallis collina, A. Vilmoriniana.

Mrs. S. Garnett-Botfield, Wolverhampton: Rhodohypoxis Baurii varieties. Dame Alice Godman, D.B.E., Horsham: Drimys Winteri latifolia, Veronica

H. W. Grigg, Esq., Tamerton Foliat: Colletia bictonensis.

F. J. Hanbury, Esq., East Grinstead: Cytisus seedlings, Oxytropis uralensis, Berberis sp.

Mr. A. Hansen, New Barnet: Sempervivum 'Arabella.'

The Marquess of Headfort, Kells: Nomocharis nana, yellow form.

Messrs. Hillier, Winchester: Fagus sylvatica aurea pendula, Dipelta yunnanensis, Cryptomeria japonica Vilmoriniana.

Collingwood Ingram, Esq., Benenden: Prunus prostrata. Lt.-Col. G. H. Loder, Handcross: Embothrium coccineum longifolium.

G. W. E. Loder, Esq., Ardingly: Cytisus supranubius.

Mrs. E. Lloyd Edwards, Wrexham: Anacyclus formosus, Erinus sp.

Mrs. Robert Lukin, Burghfield Common: Paronychia sp., Asteriscus maritimus, Sedum sp. Mrs. R. L. Newman, Dartmouth: Cytisus proliferus, Miss Wingfield's variety,

Melaleuca squamea, Sophora tetraptera.

Mr. R. C. Notcutt, Woodbridge: Syringa microphylla. Major Albert Pam, Broxbourne: Deutzia sp. F. 29071.

Mr. Amos Perry, Enfield: Davallia bullata plumosa.
Lord and Lady Rockley, Poole: Gloriosa lutea.
Messrs. L. R. Russell, Richmond: Statice 'Cœleste,' Wistaria floribunda.

Messrs. John Scott, Merriott: Artemisia vulgaris variegata.

The Hon. Mrs. Sebag Montefiore, Plymouth: Elaeagnus glabra var. Dicksonii.

Messrs. Stewart, Ferndown: Frazinus Ornus.

W. Ingham Whitaker, Esq., Lymington: Wistaria chinensis fl. pl.

ORCHID COMMITTEE.

May 9, 1934, Sir JEREMIAH COLMAN, Bart., in the Chair, and fourteen other members present.

Awards Recommended :-

First-class Certificate.

To Pleione yunnanensis (votes 7 for, 3 against), from Colonel Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath (see p. 402).

Preliminary Commendation.

To Odontoglossum × 'Duchess of York' ('Duke of York' × plumptonense) (votes unanimous), from F. J. Hanbury, Esq., The single flower on the plant was large and violet-rose.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group. To Messrs. Stuart Low, Jarvis Brook, for a group.

Sir Jeremiah Colman, Bart., Gatton Park, Surrey: Dendrobium veratrifolium, with a dozen spikes and a total of 380 flowers.

Dr. Morgan Jones, Stanley Lodge, St. Albans: Bifrenaria Harrisoniae.

F. J. Hanbury, Esq., East Grinstead: Cymbidium x ' Jungfrau.

Colonel Stephenson R. Clarke, Haywards Heath: Cypripedium niveum var. 'Goliath.

May 29, 1934, at Chelsea, Sir JEREMIAH COLMAN, Bart., in the Chair, and sixteen other members present.

Awards Recommended :-

First-class Certificate.

To Dendrobium Sanderae var. viridissimum (unanimous), from H. P. Lawson,

Esq., Lynbrook, Woking (see p. 400).

To Millonia × pulchra, Orchidhurst var. (votes 13 for), from Messrs. Armstrong & Brown, Tunbridge Wells (see p. 401).

Award of Merit.

To Odontonia × 'Tyana,' Ynshir var. (votes 9 for), from Messrs. Mansell &

Hatcher, Rawdon, Leeds (see p. 402).

To Laeliocattleya × 'Alma,' Old Dog Kennel var. (votes 14 for, 3 against),

To Odontoda x 'Columbia' var. 'Electra' (votes 11 for), from Messrs.

To Odontoda x 'Columbia' var. 'Electra' (votes 11 for), from Messrs.

Charlesworth (see p. 401).
To Odontonia × 'Olga' var. maculata (votes 12 for, 2 against), from Messrs. Charlesworth (see p. 402).

To Cymbidium × 'Mandarin,' Westonbirt var. (votes 15 for), from Messrs.

H. G. Alexander, Tetbury (see p. 400).
To Cymbidium × 'Dora' var. 'Regina' (votes 12 for, 4 against), from

Messrs. H. G. Alexander (see p. 400).

To Brassolaeliocattleya x 'Princess Shimadzu' var. 'June' (votes 12 for), from Messrs. Black & Flory, Slough (see p. 399).

To Miltonia x 'Sheila,' Brockhurst var. (votes 12 for, 2 against), from F. J.

Hanbury, Esq. (see p. 401).

Preliminary Commendation.

To Cymbidium × 'Madonna' (Alexanderi × 'P.W. Janssens') (votes 15 for), from Messrs. Armstrong & Brown, Tunbridge Wells.

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Seleni pedium × grande var. macrochilum (caudatum × longifolium).

JOINT RHODODENDRON COMMITTEE.

February 20, 1934, Lt.-Col. Stephenson R. Clarke in the Chair, and eleven other members present.

Award Recommended :-

Award of Merit.

To Rhododendron chrysodoron as a hardy flowering shrub (votes unanimous), from Lord Aberconway, Bodnant (see p. 357).

Other Exhibit.

L. de Rothschild, Esq., Exbury: R. x 'Boadicea' (R. Thomsonii x R. Hookeri).

March 6, 1934, Mr. G. W. E. LODER, F.L.S., in the Chair, and nine other members present.

There were no exhibits for the Committee's consideration.

March 20, 1934, Mr. G. W. E. LODER, F.L.S., in the Chair, and fifteen other members present.

Award Recommended :-

Award of Merit.

To Rhododendron Stewartianum as a hardy flowering shrub (votes 14 for), from L. de Rothschild, Esq., Exbury (see p. 359).

Other Exhibits.

Lord Aberconway, Bodnant: R. cinnabarinum var. 'Orange Bill.'

E. J. P. Magor, Esq., St. Tudy: R. × 'Cornubia' × R. sutchuenense. Mrs. H. P. Thompson, Weybridge: R. leucaspis.

Mr. G. Reuthe, Keston: R. ciliicalyx roseum and R. arboreum nigrescens.

April 4, 1934, Mr. G. W. E. LODER, F.L.S., in the Chair, and eleven other members present.

Exhibits.

Lord Aberconway, Bodnant, N. Wales: Rhododendron repens; R. x 'Amba' (R. racemosum, white form, x R. burmanicum); R. virgatum (K.W. 6009); R. Wilsonae.

E. J. P. Magor, Esq., Lamellen, St. Tudy, Cornwall: R. × 'Campirr' (R. campylocarpum × R. irroratum); R. × 'Cilkeisk' (R. ciliatum × R. Keiskei); R. × 'Iphigeneia' (R. haematodes × R. arboreum, blood-red form × R. Thomsonii); R. × 'Dione' (R. × hewense × R. arboreum, blood-red form).

The Marchioness of Londonderry, Mount Stewart, Newtownards, Co. Down:

R. seinghhuense (K.W. 6793).

T. W. Bacon, Esq., Ramsden Hall, Billericay: R. oreodoxa hybrid.

April 17, 1934, Mr. G. W. E. LODER, F.L.S., in the Chair, and ten other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron × 'Sarita Loder' (votes unanimous), from Lt.-Col. G. H. Loder, M.C., High Beeches, Handcross, Sussex (see p. 359).

To R. × 'Avalanche' (R. × Loderi × R. calophytum) (votes unanimous), from

Lionel de Rothschild, Esq., Exbury, Hants. (see p. 357).

Other Exhibits.

Sir John F. Ramsden, Bulstrode, Gerrards Cross: R. x 'Helena' (R. formosum × R. Edgeworthii).

Lady Loder, Leonardslee, Horsham, Sussex: R. × 'Rosamond' (R. × 'Cornubia' × R. × Loderi); R. × 'Calomina' (R. × 'Queen Wilhelmina' × R. calophytum).

Sir William Milner, Parcivale Hall, Skipton, Yorks.: R. sp.

May 1, 1934 (Rhododendron Association Show), Mr. G. W. E. Loder in the Chair, and nineteen other members present.

Awards Recommended :-

First-class Certificate.

To Rhododendron scintillans (votes unanimous), from Lionel de Rothschild, Esq., Exbury, Hants (see p. 403).

Award of Merit.

To R. x 'Mary Swaythling' (votes 8 for), from Rt. Hon. Lord Swaythling, Townhill Park, Southampton (see p. 359).

To R. imperator (votes unanimous), from Rt. Hon. Lord Swaythling (see

p. 3<u>5</u>8).

To R. argyrophyllum (votes unanimous), from G. W. E. Loder, Esq., Wakehurst

Place, Ardingly, Sussex (see p. 403).

To R. × 'Cunningham's Sulphur,' White's var. (votes unanimous), from

Mr. H. White, Sunningdale Nurseries (see p. 403).

To R. × 'Sussex Bonfire' (votes 12 for, 1 against), from Lady Loder, Leonardslee, Horsham, Sussex (see p. 359).

To R. crebreflorum (votes unanimous), from Lt.-Col. L. C. R. Messel, O.B.E.,

Nymans, Handcross, Sussex (see p. 357).

To R. caloxanthum, orange form (votes unanimous), from Lionel de Rothschild, Esq., Exbury, Hants (see p. 403).

To R. × 'Bibiani' (votes 11 for, 2 against), from Lionel de Rothschild, Esq. (see p. 403).

To R. x 'Snow Queen' (votes unanimous), from the Knap Hill Nursery Co.,

Woking, Surrey (see p. 403). To R. × impeanum (votes unanimous) (R. Williamsianum × R. orbiculare), from The Director, Royal Botanic Gardens, Kew (see p. 358).

Recommended for Trial at Exbury :-

R. x 'Cavalcade' (R. x 'Essex Scarlet' x R. eriogynum), from John

Waterer, Sons and Crisp, Bagshot, Surrey.

R. × 'Little Bill' (R. Williamsianum × R. × 'Lady Stewart of Wortley);

R. × 'Gipsy Maid' (R. × 'Sophie Gray' × R. × Loderi); R. × 'Amaryllis' (R. x 'White Pearl' x R. haemotodes): all from Messrs. Wallace, Tunbridge Wells.

Other Exhibits.

Lt.-Col. H. Spender Clay, M.P., Ford Manor, Lingfield, Surrey: R. Johnstoneanum (the Committee desired to see this plant again).

Lt.-Col. E. H. W. Bolitho, Trengwainton, Heamoor, Cornwall: R. pruni-

R. E. Horsfall, Esq., Littleworth Cross, Seale, Farnham: R. x 'James Mangles.

Mr. H. White, Sunningdale Nurseries: $R. \times$ 'Asteroid var. Rosy Queen' and $R. \times$ 'Asteroid var. Crimsom Banner' (both hybrids from the cross $R. \times$ Dr. Stocker'

r. Stocker' × R. Thomsonii); R. diphrocalyx.
Sir John F. Ramsden, Bart., Bulstrode, Gerrards Cross: R. Simsii (Forrest 26024).

Lt.-Col. L. C. R. Messel, O.B.E., Nymans, Handcross, Sussex: R. × 'Mrs. Linley Messel' (R. orbiculare, natural hybrid).

Lionel de Rothschild, Esq., Exbury, Hants.: R. carneum and R. dasycladum. Collingwood Ingram, Esq., Benenden, Kent: R. x 'Calotum' (R. calophytum $\times R. irroratum).$

Lady Aberconway, Bodnant, N. Wales: R. anthopogon.

May 8, 1934, Mr. E. H. WILDING in the Chair, and nine other members present.

Awards Recommended :-

First-class Certificate.

To Rhododendron x impeanum (votes unanimous), from The Director, Royal Botanic Gardens, Kew (see p. 358).

Award of Merit.

To Rhododendron Johnstoneanum (votes unanimous), from Lt.-Col. H. Spender Clay, M.P., Ford Manor, Lingfield, Surrey, and Lt.-Col. L. C. R. Messel, Nymans, Handcross, Sussex (see p. 358).

Col. G. H. Loder, M.C., High Beeches, Handcross, Sussex: R. x 'Isabella'

(R. Griffithianum × R. auriculatum); R. Wiltonii. Lt.-Col. L. C. R. Messel, Nymans, Handcross, Sussex: R. polyandrum. Knap Hill Nursery Co., Woking, Surrey: R Simsii var. Holjordii.

Sir John F. Ramsden, Bart., Bulstrode, Gerrards Cross: R. × 'Phillida' (R. Forsterianum \times R. Edgeworthii)—the Committee desired to see this plant at a future meeting; R. \times 'Bulstrode Belle' and R. \times 'Bulstrode Beauty' (both raised from the cross R. \times 'Loder's White' \times R. \times Loderi 'King George').

Collingwood Ingram, Esq., Benenden, Kent: R. × 'Kurumi Azalea.

May 29, 1934 (Chelsea Show), Mr. E. H. WILDING in the Chair, and fifteen other members present.

Awards Recommended :--

Award of Merit.

To Rhododendron (Azalea) 'Balzac' (votes unanimous) (see p. 357); Rhododendron (Azalea) 'Basilisk' (votes unanimous) (see p. 357); Rhododendron (Azalea) 'Berryrose' (votes 8 for) (see p. 357); and Rhododendron (Azalea) 'Hotspur' (votes unanimous) (see p. 357): all from Lionel de Rothschild, Esq., Exbury, Southampton.

To Rhododendron Elliottii (votes unanimous) (see p. 357) and Rhododendron 'Firetail' (votes unanimous) (see p. 358), both from J. J. Crosfield, Esq., Embley

Park, Romsey, Hampshire.

Other Exhibits.

Lord Digby, Minterne, Dorchester: Rhododendron sp. (Forrest No. 24748). C. E. Heath, Esq., Anstie Grange, Holmwood, Surrey: R. × 'Mrs. Cuthbert Heath ' and $R. \times$ ' Anstie.'

Lt.-Col. Giles H. Loder, High Beeches, Handcross, Sussex: R. × 'Winifred.' G. W. E. Loder, Esq., Wakehurst Place, Ardingly, Sussex: R. × 'Lanarth Scarlet' and R. Smirnowi.

Messrs. W. H. Rogers, Red Lodge Nursery, Bassett, Southampton: R.

' John Willis Fleming.

The Caldecot & Claremont Nursery Co., Goffs Oak, Herts: R. fastuosum fl. pl. 'Caldecot Improved var.' and Azalea mollis 'Blood Orange.'
Lionel de Rothschild, Esq.: Azalea 'Rosalie' and Azalea 'Brazil.'

Lady Martineau, Earlywood Chace, Ascot: R. × 'Dimity' and R. × 'Petrea.' J. J. Crosfield, Esq., Embley Park, Romsey, Hampshire: R. × 'Roman Pottery,' R. 'Embley Pink' × Griersonianum, R. × 'Azor,' and R. discolor × Madde Bruin × Griersonianum.

Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales: R. × 'Cresca' and R. x 'Sunrise.

June 12, 1934, Col. STEPHENSON R. CLARKE in the Chair, and seven other members present.

Awards Recommended :-

Award of Merit.

To Rhododendron x 'Albatross' (votes unanimous), from L. de Rothschild, Esq., Exbury, Southampton (see p. 402).

To Rhododendron x 'Fabia' (votes unanimous), from Lord Aberconway,

Bodnant, N. Wales (see p. 403). To Rhododendron × 'Benito' (votes 6 for), from L. de Rothschild, Esq. (see p. 403).

Other Exhibits.

L. de Rothschild, Esq., Exbury: R. x 'Beau Brummell' ('Essex Scarlet'. × R. eriogynum).
C. Ingram, Esq., Benenden: R. indicum × R. ledifolium.

June 19, 1934, Mr. E. H. WILDING in the Chair, and five other members present. Exhibits.

Mrs. G. W. Blaythwayt, Minehead: R. rhabdotum (A.M. 1913). L. de Rothschild, Exbury: R. brevistylum.

June 26, 1934, Mr. W. J. BEAN, V.M.H., in the Chair, and five other members present.

Award Recommended :-

Award of Merit.

Rhododendron (Azalea) 'Gumpo' (votes unanimous), from Mr. G. Reuthe, Keston, and C. Ingram, Esq., Benenden, Kent (see p. 402).

Other Exhibits.

Mr. G. Reuthe, Keston: R. didymum, referred to Scientific Committee. Lt.-Col. E. F. W. Bolitho: R. Maddenii, pink form.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

NOTICES TO FELLOWS.

SUBSCRIPTIONS.

Fellows are reminded that annual subscriptions are payable in advance on the first day of January in each year. Tickets are sent to Fellows only after the receipt of subscriptions, and Fellows cannot partake in the Plant Distribution unless their subscriptions have been paid. Fellows can at any time relieve themselves of any further trouble in the matter either by compounding their subscriptions by payment of a lump sum or by obtaining from the Secretary a Banker's Order to pay their subscription on January 1 each year.

SMALL EXHIBITS.

Although it is now late in the year for showing plants, it is perhaps never too late to draw attention to the invitation which is open to all Fellows to exhibit interesting and well-grown plants, flowers, fruits or vegetables at the fortnightly shows, even though no application for space has been made beforehand. Such exhibits should not consist of more than three pots, vases or dishes, and the clerk at the Small Exhibits Table should be notified by noon on the morning of the show so that he may stage the exhibits and provide the necessary cards.

CATALOGUES.

At this season of the year new catalogues for the coming season usually arrive. Fellows are reminded that the Society maintains in the Lindley Library a valuable collection of catalogues, not only of the past but also of the present. The Keeper of the Library would be grateful if Fellows, when turning over their accumulation of catalogues, would think of the Library and forward such as they do not want to the Secretary. Catalogues of the past are often useful in providing evidence of the introduction of a plant to horticulture or of the date of the raising of a new variety.

WHITE FLY PARASITE.

It has been possible, from time to time, during several years past to supply the White Fly Parasite from Wisley to Fellows applying for it in order to rid their greenhouses of the pest of White Fly, and the parasite has carried out its task most successfully. The supply is necessarily limited, and to maintain it special measures have to be taken which entail considerable care and expense. It has therefore been decided, next season, commencing about May, when it is usually possible for Fellows to maintain the temperature necessary for the increase of the parasite, in order to meet postage and packing costs and part of the expense in maintaining the supply, to make a charge of 5s. for the parasite for a large greenhouse and 2s. 6d. for a small one. It must be understood that the White Fly Parasite can only be supplied if available, and it is hoped that those who have a supply will pass it on to their neighbours, for if everyone used it the greenhouse White Fly might be exterminated.

THE CALENDAR.

November 6, 1934.—Fortnightly Show, I P.M. to 6 P.M. Orchids, Carnations and Chrysanthemums will be represented, and Fruit (Apples and Pears) will be among the exhibits. In the afternoon at 3.30 the Institute of Landscape Architects will hold its Annual Meeting in the Lecture Room.

November 8 and 9, 1934.—Fellows' tickets will admit to the National Chrysanthemum Society's Show in the New Hall. This show will be open on

the first day from I P.M. to 7.30 P.M., and on the second day from IO A.M. to

November 14 and 15, 1934.—Weather permitting, a practical demonstration on the planting of Fruit Trees and Roses will take place at Wisley. Those intending to be present are asked to notify the Director of the R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand.

November 20 and 21, 1934.—The British Carnation Society will hold their last Show of the year in the Old Hall. The show will be open on the first day from 1 P.M. to 7.30 P.M., and on the second day from 10 A.M. to 5 P.M. Fellows'

tickets will admit.

November 27, 1934.—Fortnightly Show, I P.M. to 5 P.M. Plants and flowers from the stove and greenhouse, Orchids, Chrysanthemums, Carnations, etc., are expected to be represented, and perhaps autumn-flowering bulbs. Among sundries, invitations to exhibit have been sent to makers of glasshouses, frames,

cloches, heating apparatus, secateurs and knives.

In the afternoon Dr. A. B. RENDLE, F.R.S., V.M.H., the Society's Professor of Botany, will deliver a lantern lecture on "My Visit to Bermuda" in the Lecture

Room of the New Hall at 3.30.

December 5, 1934.—The last practical demonstration of the year will take place at Wisley, weather permitting, when "Pruning of Trees" will be the subject. Fellows intending to be present on this occasion are requested to advise the Director of the R.H.S. Gardens, Wisley, Ripley, Surrey, of their intention.

December 12, 1934.—The last Fortnightly Show of the year, I P.M. to 5 P.M.

Forced bulbs may make their first appearance of the coming season. Orchids, especially Cypripediums, are likely to be well represented at this and the first show of the new year. Among sundries, exhibits of garden ornaments, furniture, gates, summer houses, labels, etc., have been invited. Pictures will also be exhibited.

CONFERENCES.

(a) APPLES AND PEARS.

One of the features of the Society's Great Autumn Show at the Crystal Palace, in the last week of September, was the Conference on Apples and Pears. This Conference was well attended and the subjects dealt with give information on the fruit that should be grown, on the new varieties in cultivation and on the trials for determining their qualities, on the conditions required for growing good fruit, on pruning, stocks and storing, thus covering practically every process required in fruit-growing.

The Report of the Conference, together with the discussions that took place, will be published about the end of the year as a separate book. Applications for copies should be made to the Secretary. It is anticipated that the price will

be about 7s. 6d.

(b) DAFFODILS.

The preliminary programme of the Daffodil Conference to be held from April 16 to 19, 1935, has now been settled. It will include papers on the following subjects: "Daffodils—Past and Present," "Daffodil Species," "Daffodil Trials," "Preparation for Forcing," "Breeding," "Commercial Cultivation" and "Diseases and Pests." Excursions to Wisley, Spalding and Holbeach will be arranged. The Report of the Conference will be published in the Daffodil Year Book for 1935. Full particulars of the Conference are obtainable from the Secretary.

(c) SOFT FRUITS.

The preliminary arrangements for the Cherry and Soft Fruit Conference to be held from July 17 to 19, 1935, are well in hand, and papers will be given dealing with the Cultivation of Cherries for Market; the Cultivation and Varieties of Cherries for the Private Garden; Varieties of small fruits; the Cultivation and Varieties of Strawberries useful for the Private Garden;

Gooseberries for the Market; the Manuring and Nutrition of Soft Fruits; Diseases of small fruits; Blackberries and like berries for garden purposes; Varieties of Fruits for Canning, and Canning for Domestic Purposes. Full particulars of the Conference are obtainable from the Secretary.

Publications.

Diary.—The "R.H.S. Gardeners' Diary" now appears for the twenty-fourth year, which vouches for its usefulness and popularity. In addition to the usual necessary information so important to all gardeners, space has been found for notes on Antirrhinum Rust and Celery Spot Disease, as well as for short garden notes on Rhododendrons, Auriculas and Border Carnations. Copies may be obtained from the Secretary or any bookseller, price 2s. in cloth, 5s. in leather refillable case. Refills 1s. 6d. Postage 2d. a copy.

refillable case. Refills 1s. 6d. Postage 2d. a copy.

Daffodil Year Book.—The Daffodil Year Book, 1934 (the second of the new series) is now available and contains, amongst others, articles on White Daffodils, the Cultivation of Narcissi in Bowls, Daffodils for Garden Decoration, Daffodils of the Future, Accounts of the Daffodil Shows in England and Overseas, Awards, etc., together with illustrations and descriptions of new varieties.

Lily Year Book.—The Lily Year Book, 1934 (the third issue) is now available

and contains many articles of interest to all lovers of Lilies.

These Year Books are obtainable from the Secretary, price 5s. in paper covers, 6s. in cloth.

ANTIRRHINUM RUST.

Particular attention is called to the note on Antirrhinum Rust on p. 450. This rust has spread all over the country in the past two years and Fellows are asked to take concerted action as a means of checking the disease, and are urged to enlist their neighbours' help in carrying out the measure proposed.

WISLEY GARDENS.

Attention is directed in the Calendar given above to the two demonstrations on garden practice to be given in November and December, and a cordial invitation is issued to Fellows interested to attend.

The Exhibition of Apples and Pears will be full of interest during the coming few months. Fellows will have an opportunity of seeing fruits of practically all the new varieties as well as the well-known ones. It is housed in the Exhibition Fruit Room not far from the entrance to the Gardens.

The Barberries will still be very fine during November, and Fellows will be interested to see the many fine plants, both species and hybrids, referred to in Mr. Bean's article on p. 433.

GENERAL MEETINGS.

JUNE 12, 1934.

SEWELL MEDAL COMPETITIONS.

The Sewell Medal, for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house, was awarded as follows:

Amaieur Growers' Medal.

To Mark Fenwick, Esq., Abbotswood, Stow-on-the-Wold.

Trade Growers' Medal.

To Messrs. Clarence Elliott, Stevenage.

A lecture was given by Mr. B. R. Long on "Hybridizing Irises" (see p. 375). Chairman, Mr. R. E. Spender.

A discussion on "Nomocharis" was opened by Mr. R. L. Harrow, V.M.H., and Mr. C. T. Musgrave, V.M.H., under the chairmanship of Mr. F. C. Stern, F.L.S.

An epitome of this discussion appears in the Lily Year Book, 1934.

JUNE 19, 1934.

AMATEURS' FLOWER SHOW.

CHIEF AWARDS.

Silver Cup, to the most successful competitor in Division A. To Lieut.-Col. Stephenson R. Clarke, C.B., Borde Hill, Cuckfield. Silver Cup, to the most successful competitor in Division B. To D. C. Junkin, Esq., Ravenswold, Kenley, Surrey.

Silver Cup, to the most successful competitor in Division C.

To C. Luckin, Esq., Wadlands, East Grinstead.

JULY 10, 1934.

The Banksian Medal, offered for the best new hybrid Lily shown by an amateur, was awarded to J. E. H. Stooke, Esq., Danesmere, Hereford, for Lilium 'Fire King.'

A discussion on the Lilies exhibited was opened by Mr. A. Grove under the chairmanship of Mr. F. C. Stern, F.L.S.

An epitome of this discussion appears in the Lily Year Book, 1934.

JULY 24, 1934.

CLAY CHALLENGE CUP COMPETITION.

The Clay Challenge Cup, which was offered for award for a new Rose possessing the true old rose scent, was not awarded.

A lecture was given by Mr. C. D. O'Donoghue on "Succulents and other Cacti." $\,\cdot\,$

Chairman, Mr. W. W. Pettigrew, V.M.H.

August 14, 1934.

FOREMARKE CHALLENGE CUP COMPETITION.

The Foremarke Challenge Cup, for twenty spikes of named Gladioli in not less than ten varieties, was awarded to Mr. E. R. Lynas, Redcar.

A Silver Banksian Medal was awarded to Mr. P. Miller, Hounslow, who was placed second.

August 28, 1934.

SEWELL MEDAL COMPETITION.

The Sewell Medal, for the best exhibit of six pots or pans of plants suitable for the rock garden or alpine house shown by an amateur, was awarded to Mark Fenwick, Esq., Abbotswood, Stow-on-the-Wold.

EXHIBITION OF BRITISH GROWN BULBS.

AWARDS.

Gold Medal.

To Messrs. Seymour Cobley, Spalding, for Daffodil, Tulip, Hyacinth, Iris and Scilla bulbs.

To Mr. G. H. Furness, Burnham, for Hyacinth bulbs.

Silver-gilt Lindley Medal.

To the Agricultural Institute and Experimental Station, Kirton, for educational exhibit dealing with bulb production.

Silver-gilt Banksian Medal.

To Mr. W. Dent, Moulton, for Daffodil, Tulip and other bulbs.

To the Spalding Bulb Growers' Association, Spalding, for Daffodil, Tulip, Hyacinth and other bulbs.

Silver Flora Medal.

To the Cornwall and Scilly Isles Bulb Growers, for Daffodil, Tulip and Iris bulbs.

To Mr. George Elsom, Spalding, for Daffodil, Tulip, Hyacinth, Muscari, Scilla and other bulbs.

Silver Banksian Medal.

To Messrs. Cross, Wisbech, for Daffodil, Tulip, Lily, Crocus, Scilla and other bulbs.

To Messrs. Daniels, Norwich, for Daffodil, Tulip, Hyacinth and other bulbs.

A lecture was given by Mr. T. H. EVERETT on "The Southern Appalachian Expedition.'

Chairman, Mr. C. T. Musgrave, V.M.H.

SCIENTIFIC COMMITTEE.

June 12, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and eight other members present.

Marigold proliferous.—Mr. Hales showed a "hen and chickens" Marigold in which the capitulum had branched producing secondary capitula—a form apparently becoming increasingly common.

Saliz pentandra catkin aberrant.—Mr. J. Fraser showed a much enlarged catkin of Saliz pentandra in which the scales were serrated much as in the normal leaves. He was not certain but suspected the mite Eriophyes triradiatus as the cause of the trouble.

Plants for naming.—The following plants were referred from Floral Committee B-Iris Boissieri, a bulbous Iris from Spain; Allium nigrum roseum and A. multibulbosum, the former found in a cornfield in Morocco; Stachys corsica sent as a Teucrium, from Corsica; Hippeastrum equestre said to have come from Jamaica; and a Crinum near C. Schimperi from the district of Zambesia.

Malformed Meconopsis.—An aberrant flower of Meconopsis cambrica which

had been referred to Mr. Worsdell was reported upon by him as follows:—
"The sepals have become persistent instead of caducous, enlarged beyond the normal and greatly increased in number owing to the fact that, from within outwards, fresh ones have been formed by transformation of the petals, and these last (here represented only by four or five exceedingly small white structures) by transformation of the stamens. Near the centre can be seen transitional forms between sepals and petals."

This abnormality and a similar one I have seen in Papaver nudicaule seem to me to support the view that the calyx (in Papaveraceae at any rate) is derived, directly or indirectly, from the androecium and not, as is generally supposed, from bracts or foliage leaves."

June 26, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Plantains.—Mr. J. Fraser showed dried specimens of various Plantains including the annual Plantago ramosa, P. major intermedia and P. major minima and made remarks upon their distribution.

Green Rose .- A specimen of the well-known "green rose" from a standard tree was shown. This Rose is apparently a sport from the pink Rosa indica. It

sometimes forms pollen grains but no ovules.

Rhododendron didymum.-A specimen of this species from Mr. Reuthe of Keston was referred to the Committee from the Joint Rhododendron Committee who had expressed the opinion that though the flowers were of too deep a crimson to be of value in garden decoration, the plant was of potential value to the hybridist. A Botanical Certificate was unanimously recommended for it.

July 10, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Papaver nudicaule aberrant.—Mr. Champernowne sent from a garden in Devon a flower of *Papaver nudicaule* devoid of petals in which all the stamens had become somewhat flattened and elongated. The ovary appeared normal.

Oenotheras at Wisley.—A series of Oenotheras of the fruticosa section exhibited to Floral Committee A were referred to Mr. Chittenden for identification.

Variation in Lilium regale.—Lady Byng brought examples of Lilium regale to illustrate the marked variation in external colouring shown by seedlings of this species.

Anthemis arabica.—A plant of this species was exhibited by Messrs. Barr to show the curious and successive growth of innovations from beneath the old capitula.

Lilium nepalense var. primulinum.—Mr. J. C. Watt sent a flower of this pale green form of Lilium nepalense like the type in all but colouring. The sender remarked upon the disagreeable odour emitted by the flowers in the evening. A similar form of L. ochraceum is known.

July 24, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Oenotheras at Wisley.—Mr. Chittenden reported that he had examined the Oenotheras under trial at Wisley, the names of which were in doubt (see Minute 2, July 10, 1934) and found that Nos. 22 and 27 belong to O. fruticosa; Nos. 21, 23 and 25 horticulturally somewhat similar to these were distinct from the type in certain characters but were themselves alike and were probably derived from a single seedling variation; Nos. 26 and 32 are O. fruticosa Youngii, 24 O. fruticosa major, 2, 13, 14, 30 O. fruticosa Wm. Cuthbertson (called Eldorado by one sender), No. 28 O. Pilgrimii, 34, O. glauca Fraseri (33 and 35 were apparently seedlings of the same type but distinct from No. 34), No. 6 O. riparia, No. 20 O. serotina?

Campanula lanata.—A Campanula shown under the name C. velutina was referred to the Committee by Floral Committee B, and the name has been verified at Kew as C. lanata (C. velutina being an untenable name). It is quite distinct from C. Formaneckiana in the form of its basal leaves, which are cordate with simple instead of lobed petioles, the flowers also of C. Formaneckiana are larger than in C. lanata.

Wahlenbergia multicaulis.—A Wahlenbergia with white flowers shown by Mr. Collingwood Ingram, also referred from Floral Committee B, has been identified at Kew as W. multicaulis.

Mentha.—A prostrate Mentha from Morocco sent by Mr. G. P. Baker was

referred to Mr. Fraser (see p. cxcv).

Plants from Afghanistan. Lord Rosse and Mr. Sykes showed pieces of plants collected by Mr. R. M. Byron on the Hindu Kush Mts. and the Committee gave

names so far as the specimens permitted.

Daphne diseased.—Dr. Tincker on behalf of Mr. Green showed leaves of Daphne Mezereum attacked by a species of Marssonina. The disease was being

further investigated at Wisley.

Salix arenaria.—Mr. Fraser showed specimens indicating the variations in the length of the style found on different plants. The exact identity of this species seems in doubt since Linnaeus' specimens are of S. Lapponum, but the

variations observed Mr. Fraser considers are no more than "growth forms."

Catalpa seeds.—Mr. Hales showed seedlings of Catalpa bignonioides and remarked upon the tenuity of the seeds produced at Chelsea Physic Garden in

spite of which they proved fertile.

Rudbechia hirta.—Mr. Hay showed variations in Rudbechia hirta, a weed of American cornfields. The usual form is yellow but reddish forms have appeared, seedlings from which however have given 60 per cent. yellow plants. These yellow plants have green stems, the stems of those with red in the flowers are tinged.

August 14, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and five other members present.

Mentha Pulegium var. tomentella.—Mr. Fraser reported that the mint from Morocco proved to be M. Pulegium var. tomentella.

Flowers from Korea.—Dr. Hurst showed a number of drawings of plants in

Korea made on the spot, including a large number of Violas.

Salix herbacea × Lapponum.—Mr. Fraser showed dried specimens of Salix herbacea × Lapponum from the Wisley Rock Garden and from Lochnagar. The latter differed from the former in having crenate margins.

Fasciated Gentiana Farreri.—Mr. Musgrave showed Gentiana Farreri with a

fasciated calyx and two corollas.

Matricaria Chamomilla \times M. suaveolens?—Mr. Bowles showed what may be a hybrid between these two species which Mr. Fraser took for detailed examination.

Fasciated Strawberry.—Mr. Fraser showed a Strawberry with fasciated fruit, typical of all which had appeared in a field. The central fruit was reduced and numerous small lateral fruits had developed.

August 28, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and five other members present, and Major Cheeseman, visitor.

Abyssinian plants.—Major Cheeseman of Tilsden, Cranbrook, showed a Gladiolus apparently identical with G. dracocephalus which he had collected in N.W. Abyssinia at an altitude of 7,000 feet, and Antholyza abyssinica from the same district.

Lilium candidum "double."—Mr. Fraser showed a specimen of the double Lilium candidum in which the perianth segments are repeated again and again on an elongated axis. This form is a robust grower but "flowers" usually only in hot summers.

Bracken variegated.—Mr. Bowles showed a frond of Bracken with distinct variegation, collected in Scotland. He also showed

Parthenocissus tricuspidata with leaves trifoliate and simple, the greater

number on the plant being compound.

Anodyne necklaces.—Mr. Bowles showed specimens dating from 1831 and 1863 of the "anodyne necklaces" advertised as useful for children when cutting teeth, and much used in the nineteenth century, consisting of strings of elongated cream beads cut from the root of the Pæony. They are referred to by Mrs. Lancaster in her account of Pæony lore in Sowerby's English Botany. He also exhibited an advertisement of the period commending them.

Odontoglossum flowering irregularly.—An Odontoglossum pseudobulb with two flowers emerging from the apex of the pseudobulb which still bore two leaves was exhibited. The plant had apparently received a check to its normal growth.

was exhibited. The plant had apparently received a check to its normal growth. Twin apple.—A twin apple with the stalks of two flowers and the flesh connate but with two distinct pistils was shown.

FRUIT AND VEGETABLE COMMITTEE.

June 12, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members present.

Exhibit.

Lady Leconfield (gardener Mr. F. Streeter), Petworth Park: fruits of Newberry.

June 26, 1934, Mr. E. A. Bunyard, F.L.S., in the Chair, and eight other members present.

Awards Recommended :-

Silver-gilt Hogg Medal.

To Messrs, T. Rivers, Sawbridgeworth, for Peaches, Nectarines, Cherries, and Plums in pots.

Hogg Medal.

To Mr. T. Avery, Gaddesden Place Gardens, Hemel Hempstead, for group of Strawberry 'Gaddesden.'

CXCVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Other Exhibits.

Lady Leconfield, Petworth Park: Nectarines and Strawberries. Mr. E. A. Bunyard, Allington: Strawberry 'American Seedling.'

July 10, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and nine other members present.

Exhibit.

Mr. E. A. Bunyard, Allington: Lettuce 'Marshall's Matchless.'

July 24, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members

Exhibits.

Miss O. Candler, Eversley, Hants.: Raspberry 'Viking.'

Commercial Fruit Trial Grounds, Wisley: specimens of Loganberry, Hanway Berry, Phenomenal Berry, Newberry, Youngberry and 'Bedford Giant' Blackberry. Plums: 'Early Laxton' and 'Rivers' Early Prolific.' Apples: 'Early Crimson,' 'Arthur Turner,' 'Early Victoria,' 'Grenadier,' 'Sowman's Seedling' and 'Dr. Clifford.'

August 14, 1934, Mr. J. CHEAL, V.M.H., in the Chair, and eight other members present.

Exhibits.

The Plum 'Abundance,' exhibited by Messrs. Laxton Bros., Bedford, was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Messrs. Laxton, Bedford: Blackberry 'Bedford Giant.'

Mr. J. E. Eyre, Abbey Green, Wisbech: Seedling Pear. Messrs. W. Wood, Billingham Park Nurseries, Wokingham: Tomato for opinion.

Mr. G. V. Leach, Brocklebank Road, Wandsworth: Loganberry Seedling. Sir Charles Ellis, Rotherfield Hall, Jarvis Brook: Raspberry Seedling. Commercial Fruit Trials, Wisley: Apples 'Maidstone Favourite,' 'Melba'; Plum 'Utility.

Mr. J. Cheal, Crawley: Plums for opinion.

August 28, 1934, Mr. E. A. Bunyard, F.L.S., in the Chair, and eight other members present.

Exhibits.

Messrs. J. C. Allgrove, Slough: Apple 'J. D. Colledge.'
Mr. W. H. Divers, V.M.H., Surbiton: Plum 'Early Transparent Gage.'
Commercial Fruit Trials, Wisley: Apples 'George Neal,' 'Thomas Jeffreys,'
'Laxton's Exquisite,' 'Seedling W.Y. 25,' 'Seedling A.S.D. 22,' 'Golden
Russet'; Plums 'Chivers' Cambridge Gage,' 'La Deliceuse,' 'Goldfinch.' 'Golden

FLORAL COMMITTEE A.

June 12, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Dobbie, Edinburgh, for Antirrhinums.

Silver-gilt Banksian Medal.

To Messrs. Baker, Wolverhampton, for Lupins and Delphiniums.

To Messrs. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Silver Flora Medal.

To Major G. Churcher, Lindfield, for Pæonies. To Messrs. W. H. Simpson, Birmingham, for Lupins.

Silver Banksian Medal

To Messrs. Bunyard, Maidstone, for Irises and Pæonies. To Messrs. Daniels, Norwich, for Irises and Lupins.

To Mr. Gavin Jones, Letchworth, for herbaceous plants. To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants. To Messrs. Prichard, Christchurch, for Lupius.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

To Messrs. Sutton, Reading, for *Pentstemon glaber* 'Sutton's Hybrids.' To Messrs. Wakeley, London, for Irises, etc.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Kelway, Langport, for Pæonies and Pyrethrums.

To Messrs. Prince, Longworth, for Roses. To Mr. C. Wall, Bath, for Border Carnations.

Banksian Medal.

To Messrs. Engelmann, Saffron Walden, for Carnations and Pansies.

To Messrs. Harkness, Leeming Bar, for Lupins and Poppies.

To Messrs. Hewitt, Solihull, for Lupins.

To Messrs. Redgrove & Patrick, Seal, for Lupins, Irises, Pæonies, etc. To Messrs. Simmons, Finchley, for Violas.

Award of Merit.

To Border Carnation 'Mrs. C. Wall' for cutting (votes unanimous), from Mr. C. Wall, Bath. See p. 444.

Selected for trial at Wisley.

Contaurea Cyanus minor 'Blue Gem,' from Messrs. Hurst, London.

Pæony 'Fire King,' from Messrs. Bath, Wisbech.

Papaver orientale 'Little Gem,' from Messrs. Watkins & Simpson, London.

Other Exhibits.

Mr. E. J. Barker, Ipswich: Papaver nudicaule 'Barker's Ipswich Strain.'

Mrs. J. Bell, Hook: Climbing Rose 'Bella Portuguesa.'

Messrs. Bunyard, Maidstone: old-fashioned Roses.

Messrs. Gibson & Amos, Cranleigh: Irises and Lupins.

Messrs. Hayward, Clacton-on-Sea: Dianthus.

C. Ingram, Esq., Benenden: Iris' Pluie d'Or.'

Mr. F. Ley, Windlesham: Roses' Climbing Else Poulsen' and 'Climbing Mabel Morse.

Rev. W. Shirley, Oxford: Digitalis ambigua × purpurea.

Mrs. E. M. Stephenson, Colchester: Pyrethrum 'Mrs. Frank Atthill.' West Byfleet Nursery, New Haw: herbaceous plants.

June 19, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :-

Award of Merit.

To Anchusa 'Morning Glory' as a hardy plant for the herbaceous border (votes unanimous), from Messrs. Wells, jun., Merstham. See p. 444.

To Rose 'Elizabeth Lee' (votes unanimous), from Messrs. Chaplin, Waltham Cross (see p. 404).

CXCVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Other Exhibits.

C. Bedbrook, Esq., Wallington: Adiantum elegantissimum Gladii (to be seen again), A. elegantissimum ericoides.

Major G. Churcher, Lindfield: Pæonies 'Fashion' and 'Fuyajo' (to be seen

again).

Lady Leconfield, Petworth: Godetia 'Ladybird.'

June 26, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Van Leeuwen, Sassenheim, Holland, for Pæonies.

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

Silver Flora Medal.

To Messrs. Barr, London, for Irises, etc. To Messrs. Bath, Wisbech, for Pæonies.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Dobbie, Edinburgh, for Roses.

To Mr. E. Ladhams, Elstead, for herbaceous plants and Water Lilies.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

Silver Banksian Medal.

To Messrs. B. R. Cant, Colchester, for Roses. To Messrs. Lowe, Beeston, for Roses.

Flora Medal. To Messrs. F. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations and Zinnias.

To Mr. H. Lakeman, Thornton Heath, for Border Carnations.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and Dianthus Allwoodii.

To Mr. Gavin Jones, Letchworth, for herbaceous plants.

To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To Pæony 'Solange' for show, cutting and market (votes 9 for, 3 against), from Major G. Churcher, Lindfield. See p. 448.

To Rose 'Climbing Cherry' (votes 12 for), from Messrs. Savage, Barkingside. See p. 404.

Other Exhibits.

Messrs. B. R. Cant, Colchester: Roses 'Lady English,' 'Lady Susan Birch,' and 'Samuel Pepys.

Messrs. Chaplin, Waltham Cross: Roses 'Daphne' and 'Valerie.'

Messrs. Clark, Dover: herbaceous plants.

Messrs. Hayward, Clacton-on-Sea: Dianthus.

Mr. A. Miles, Bickley: herbaceous plants. Rolvenden Nurseries, Rolvenden: Statice latifolia, Chilwell variety. Messrs. Slocock, Woking: Roses' Blaze' and 'Mrs. Arthur Curtiss James' (to be seen again).

Mr. G. E. P. Wood, Ashtead: Delphiniums and Violas.

July 10, 1934, Mr. G. W. Leak, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Baker, Codsall, for Delphiniums.

To Messrs. Waterer, Sons & Crisp, Twyford, for herbaceous plants.

Silver Flora Medal.

To Messrs. Barr, London, for herbaceous plants.

To Messrs. Dobbie, Edinburgh, for Roses.

Silver Banksian Medal.

To Messrs. Bath, Wisbech, for Pæonies, Lilies, and Delphiniums.

To Messrs. B. R. Cant, Colchester, for Roses.

To Donard Nursery, Newcastle, co. Down, for Iris Kaempferi and Dieramas. To Mr. J. Douglas, Great Bookham, for Border Carnations. To Knaphill Nursery, Woking, for Iris Kaempferi and Lilies.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

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Flora Medal.
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To Messrs. Daniels, Norwich, for Larkspurs.

To Messrs. Prichard, Christchurch, for herbaceous plants.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Dartington Hall Ltd., Totnes, for herbaceous plants. To Messrs. Engelmann, Saffron Walden, for Carnations.

To Mr. Gavin Jones, Letchworth, for herbaceous plants.

To Mr. A. Miles, Bickley, for herbaceous plants.

To Messrs. Reuthe, Keston, for herbaceous plants and shrubs.

To Messrs. Stewart, Ferndown, for herbaceous plants.

To Messrs. Wheatcroft, Gedling, for Roses. To Mr. G. E. P. Wood, Ashtead, for Delphiniums, Violas, etc.

Award of Merit.

To Chrysanihemum maximum 'Phyllis Elliott' for cutting and border (votes 10 for, 5 against), from Messrs. C. Elliott, Stevenage. See p. 444.

To H.T. Rose 'Phyllis Gold' (votes unanimous), from Mr. H. Robinson,

Hinckley. See p. 404.

Selected for trial at Wisley.

Catananche coerulea 'Perry's White,' from Mr. A. Perry, Enfield. Hemerocallis 'Bretwalda,' from G. Yeld, Esq., Gerrards Cross. Papaver nudicaule 'Golden Wings,' from Messrs. Stark, Fakenham.

Other Exhibits.

Messrs. Allwood, Haywards Heath: Border Carnation 'Golden Ray.'

Mr. W. Boxall, Winchmore Hill: Rose sport.

Messrs. Hayward, Clacton-on-Sea: herbaceous plants.

Mr. A. Perry, Enfield: herbaceous plants.
Miss E. K. S. Powell, Farnham: Dianthus seedling.
Messrs. Savage, Barkingside: Chrysanthemum maximum 'Chigwell Giant.'
Messrs. Stark, Fakenham: Papaver nudicaule' Artistic 're-selected.

Mrs. G. Turner, Kingston-on-Thames: Pelargonium seedling.

July 24, 1934, Mr. J. M. Bridgeford in the Chair, and sixteen other members present.

Awards Recommended :-

Gold Medal.

To Messrs. Sutton, Reading, for annuals.

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Roses.

To Donard Nursery Co., Newcastle, co. Down, for Dieramas.

Silver Flora Medal.

To Messrs. Bath, Wisbech, for Lilium regale and other herbaceous plants.

To Messrs. Dickson, Newtownards, for Roses.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Phloxes.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. F. Cant, Colchester, for Roses. To Messrs. Chaplin, Waltham Cross, for Roses. To Messrs. Kelway, Langport, for Gladioli.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

To Messrs. Prichard, Christchurch, for herbaceous plants.

Flora Medal.

To Suffolk Seed Stores, Woodbridge, for herbaceous plants.

Banksian Medal.

To Mr. W. E. B. Archer & Daughter, Sellindge, for Roses.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Letts, Hadleigh, for Roses.

To Messrs. Reuthe, Keston, for herbaceous plants and shrubs.

To Messrs. Vert, Saffron Walden, for Hollyhocks.

To Messrs. Wheatcroft, Gedling, for Roses.

Award of Merit.

To Dierama pulcherrimum' Skylark' as a border plant (votes 14 for, 1 against), from Donard Nursery Co., Newcastle, co. Down. See p. 445.

Selected for trial at Wisley.

Border Carnation 'Border Fancy,' from Messrs. Allwood, Haywards Heath.

Other Exhibits.

C. Bedbrook, Esq., Wallington: Adiantum 'Eric Bedbrook' and A. 'Gladys Bedbrook' (to be seen again).

Messrs. Clark, Dover: herbaceous plants.

T. Hay, Esq., V.M.H., Hyde Park: seedling colour forms of Rudbeckia hirta.

Messrs. Letts, Hadleigh: Rose 'Climbing Little Dorritt.'
L. H. Marten, Esq., Catsfield: Begonia 'Lorna Marten.'
Miss M. McLaren, Hindhead: seedling Gladiolus.
Messrs. Prichard, Christchurch: Achillea 'Gold Plate.'

August 14, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :-

Silver Flora Medal.

To Mr. E. Ladhams, Elstead, for herbaceous plants.

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for Dahlias and Pentstemons.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Mr. A. Miles, Bickley, for herbaceous plants.

Flora Medal.

To Messrs. B. R. Cant, Colchester, for Roses.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. E. Ballard, Colwall, for Echinacea purpurea, Colwall strain. To Messrs. Bloom, Oakington, for Heliopsis, Delphiniums and Rosa Lawranceana.

To Messrs. Engelmann, Saffron Walden, for Carnations.

Other Exhibits.

Messrs. Bentall, Havering-atte-Bower: Roses.
Mrs. H. W. Hall, Downton Fields, Nr. Lymington: Gladiolus 'Lucifer.'
J. C. Hawker, Esq., Westhumble: Gaillardia seedling.
Mr. A. Perry, Enfield: Catananches.

Messrs. Prichard, Christchurch: Lobelia cardinalis 'The Test.'

Messrs. Wheatcroft, Gedling: Roses.

August 28, 1934, Mr. J. M. BRIDGEFORD in the Chair, and eleven other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. S. Ogg, Swanley, for Dahlias.

To Messrs. Wakeley, London, for Gladioli.

Silver Banksian Medal.

To Messrs. Kelway, Langport, for Gladioli.

To Mr. E. Ladhams, Elstead, for herbaceous plants. To Messrs. W. Lowe, Beeston, for Roses. To Mr. C. Turner, Slough, for Dahlias.

Flora Medal.

To Messrs. B. R. Cant, Colchester, for Roses.

To Mr. H. Hemsley, Crawley, for Dahlias. To Mr. E. B. Le Grice, North Walsham, for Roses.

To Messrs. Prichard, Christchurch, for herbaceous plants.

Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and Pinks.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Messrs. Daniels, Norwich, for Gladioli, etc.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Mr. A. Miles, Bickley, for herbaceous plants.

To Messrs. Redgrove & Patrick, Sevenoaks, for Dahlias.

To Messrs. Reuthe, Keston, for herbaceous plants.

Other Exhibits.

Messrs. Kelway, Langport: Gladiolus 'Happiness.' Mr. C. T. Kipping, Chelmsford: Chrysanthemum 'Mayland Bronze.' Mr. E. Ladhams, Elstead: Lobelia 'Elstead Charming.'

Mr. G. F. Letts, Hadleigh: herbaceous plants. Messrs. W. Lowe, Beeston: Rose 'F. W. Lowe.'

FLORAL COMMITTEE B.

June 12, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Silver Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for bulbous plants in pans.

To the Napsbury Mental Hospital, St. Albans, for Crassulas.

Lindley Medal.

To Messrs. Bunyard, Maidstone, for Rosa species.

Banksian Medal.

To Mr. W. A. Constable, Southborough, for Lilies.

To Messrs. Neale, Newhaven, for Mesembryanthemums, Cacti and Gazanias.

First-class Certificate.

To Statice 'Coeleste' as a flowering plant for the greenhouse (votes 8 for, 2 against), from Messrs. L. R. Russell, Richmond. See p. 404.

Award of Merit.

To Calochortus Kennedyi as a tender flowering plant (votes 13 for, 1 against), from Lt.-Col. C. H. Grey, Cranbrook. See p. 399.

To Campanula Elatines as a flowering plant for the rock garden and alpine house (votes 15 for), from Dr. P. L. Giuseppi, Felixstowe. See p. 400.

To Ceanothus cyaneus as a hardy flowering shrub (votes 17 for), from the Director, Royal Botanic Gardens, Kew. See p. 400.

To Fabiana imbricata as a hardy flowering shrub (votes unanimous), from

Lord Horder, Petersfield. See p. 400.

To Iris Boissieri as a hardy flowering plant (votes 9 for, 1 against), from Collingwood Ingram, Esq., Benenden. See p. 401.

To Linum salsoloides nanum as a flowering plant for the rock garden and alpine house (votes 13 for), from Dr. P. L. Giuseppi, Felixstowe. See p. 401.

To Spiraea Henryi as a hardy flowering shrub (votes 13 for, 4 against), from

Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 404.
To Verbena tridens as a hardy flowering shrub (votes 9 for, 2 against), from Messrs. Clarence Elliott, Ltd., Stevenage. See p. 405. Other Exhibits.

Lord Aberconway, Bodnant: Primula pusilla.

Hiatt C. Baker, Esq., Almondsbury: Olearia stellulata, Melia Azedarach. Frank Barker, Esq., Stevenage: Phyteuma comosum album.

Mr. H. S. Boothman, Maidenhead: alpine plants in pans.

Messrs. Burkwood & Skipwith, Kingston-on-Thames: flowering shrubs.

Messrs. C. Elliott, Stevenage: Nepeta Mussinii 'Six Hills Giant,' Linum narbonneuse 'Six Hills Variety,' Sisyrinchium odoratissimum.

Dame Alice Godman, D.B.E., Horsham: Discaria discolor, Allium nigrum

roseum, Stachys corsica.

Dr. P. L. Giuseppi, Felixstowe: Sedum Winckleri, Campanula rupicola.

Tristram Hart, Esq., Beaconsfield: Dianthus neglectus hybrid.

Lady Henderson, Hertford: Crinum Schimperi, Hippeastrum equestre.

The Misses Hopkins, Coulsdon: rock plants.

Mr. Gavin Jones, Letchworth: alpine plants.

Mr. A. Kench, Weybridge: alpine plants. Lt.-Col. L. C. R. Messel, Handcross: Neillia longiracemosa, Leptospermum nitidum, Melaleuca squamosa, Discaria discolor, Lilium hyacinthinum.

Mrs. R. L. Newman, Dartmouth: Ornithogalum arabicum.

Messrs. Rogers, Southampton: alpine plants and shrubs.

Messrs. L. R. Russell, Richmond: Gloriosa Rothschildiana.

Major G. H. Tristram, Dallington: Cistus hirsutus hybrid.

June 19, 1934, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

First-class Certificate.

To Cytisus Battandieri as a hardy flowering shrub (votes 8 for, 2 against) from T. Hay, Esq., Hyde Park, London, W. 2. See p. 445.

To Zenobia speciosa pulverulenta as a hardy flowering shrub (votes unanimous), from the Knap Hill Nursery Co., Woking. See p. 405.

Award of Merit.

To Campanula Morettiana alba as a flowering plant for the rock garden and alpine house (votes 11 for, 1 against), from Dr. and Mrs. Fred Stoker, Loughton.

See p. 444.

To Campanula Morettiana eximia as a flowering plant for the rock garden

To Campanula Morettiana eximia as a flowering plant for the rock garden. See and alpine house (votes 11 for), from Dr. and Mrs. Fred Stoker, Loughton. See

To Catalpa Duclouxii as a hardy flowering tree (votes 12 for, 1 against), from

the Director, Royal Botanic Gardens, Kew. See p. 444.

To Cyananthus Hayanus as a flowering plant for the rock garden and alpine house (votes 7 for), from T. Hay, Esq., Hyde Park, London, W. 2. See p. 445.

To Epilobium angustifolium, pink variety, as a hardy flowering plant (votes 12 for), from G. D. Roper, Esq., Chard. See p. 446.

To Eremurus 'Golden Torch' as a hardy flowering plant (votes unanimous),

from Major F. C. Stern, Goring-by-Sea. See p. 446. To Robinia hispida as a hardy flowering tree (votes unanimous), from the Rt. Hon. Lord Swaythling, Southampton. See p. 448.

Other Exhibits.

University Botanic Garden, Cambridge: Jasminum revolutum, Rosa x Coryana.

Dame Alice Godman, D.B.E., Horsham: Salvia bicolor.

Dr. P. L. Giuseppi, Felixstowe: Lewisia rediviva red form, Campanula Cuatrecasasii.

T. Hay, Esq., Hyde Park: Lilium rubescens, Campanula Loefflingii.

H. S. Hotblack, Esq., Cuckfield: Buddleia Forrestii.

Royal Botanic Garden, Kew: Styrax Veitchiorum.

Knap Hill Nursery Co., Woking: Pieris Mariana.

L. de Rothschild, Esq., Exbury: Callistemon salignus.

Mrs. R. L. Newman, Dartmouth: Phlomis Russelliana.

Major F. C. Stern, Goring-by-Sea: Callistemon pallidus, Leycesteria crocothyrsos.

Dr. and Mrs. Fred Stoker, Loughton: Campanula Piperi.

June 26, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Floral Medal.

To Mr. W. A. Constable, Southborough, for Lilies.

To Mr. Amos Perry, Enfield, for Lilies and other bulbous plants.

Lindley Medal.

To the Rt. Hon. Lord Swaythling, Southampton, for Lilies.

Banksian Medal.

To Messrs. J. Cheal, Crawley, for flowering shrubs. To Messrs. Hillier, Winchester, for flowering shrubs.

To Hocker Edge Gardens, Cranbrook, for alpine and bulbous plants.

To Messrs. Reuthe, Keston, for shrubs and hardy flowers.

To Messrs. L. R. Russell, Richmond, for Nymphaeas and ferns.

First-class Certificate.

To Stewartia malachodendron as a hardy flowering shrub (votes 15 for), from the Knap Hill Nursery Co., Ltd., Woking. See p. 404.

Award of Merit.

To Crepis incana as a flowering plant for the alpine house (votes 10 for, 5 against), from Mrs. Gwendolyn Anley, Woking. See p. 445.

To Diplarrhena Moraea as a hardy flowering plant (votes 7 for, 3 against),

from Collingwood Ingram, Esq., Benenden. See p. 446.

To Erica umbellata as a hardy flowering shrub (votes 9 for, 1 against), from

Lord Aberconway, Bodnant. See p. 446.

To Lilium cernuum as a hardy flowering plant (votes unanimous), from Miss Amy Baring, Chandler's Ford, Hants, and C. P. Raffill, Esq., Richmond. See p. 447.
To Scabiosa macedonica lyriophylla as a hardy flowering plant (votes 13 for),

from Mr. Ernest Ladhams, Élstead. See p. 404.

Preliminary Commendation.

To Campanula pilosa as a flowering plant for the rock garden (votes unanimous), from Lt.-Col. C. H. Grey, Hocker Edge Gardens, Cranbrook.

To Gentiana scarlatina as a flowering plant for the rock garden and alpine house (votes unanimous), from Lord Aberconway, Bodnant.

Cultural Commendation.

To Mr. James Comber, gardener to Lt.-Col. L. C. R. Messel, O.B.E., Nymans, Handcross, for an exhibit of Lilium Bakerianum.

Other Exhibits.

Mr. H. S. Boothman, Maidenhead: alpine plants. Lt.-Col. C. H. Grey, Cranbrook: Calochortus clavatus, Campanula nitida.

Mr. A. Hansen, New Barnet: shrubs and hardy plants.

The Misses Hopkins, Coulsdon: rock plants.

Messrs. Stuart Low, Enfield: Clerodendron ugandense, Allamanda sp.

C. T. Musgrave, Esq., Hascombe: Aster sp.
Mrs. R. L. Newman, Dartmouth: Richardia Rehmannii, Callistemon sp., Watsonias.

Messrs. Rogers, Southampton: shrubs and alpine plants.

Messrs. J. Waterer, Sons & Crisp, Twyford: herbaceous and alpine plants.

July 10, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty-seven other members present.

Awards Recommended :-

Gold Medal.

To Mr. W. A. Constable, Southborough, for Lilies. To Messrs. R. Wallace, Tunbridge Wells, for Lilies.

Silver-gilt Banksian Medal.

To the Rt. Hon. Lord Swaythling, Southampton, for Lilies.

Silver Banksian Medal.

To Hocker Edge Gardens, Cranbrook, for Lilies.

Banksian Medal.

To Messrs. Hillier, Winchester, for Lilies and other hardy plants.

To Messrs. Perry, Enfield, for Hemerocallis.

First-class Certificate.

To Lilium candidum as a hardy flowering plant (votes 15 for, 1 against), from

Dr. and Mrs. Fred Stoker, Loughton. See p. 447.

To Rhododendron rhabdotum as a hardy flowering shrub (votes 6 for), from Lionel de Rothschild, Esq., Exbury. See p. 448.

Award of Merit.

To Acanthophyllum spinosum as a hardy flowering plant (votes 8 for), from Messrs. M. Prichard, Christchurch. See p. 444.

To Gentiana cachemirica as a flowering plant for the rock garden (votes 13 for),

from T. Hay, Esq., Hyde Park. See p. 446.

To Lilium Brownii as a hardy flowering plant (votes unanimous), from Dr. and Mrs. Fred Stoker, Loughton, and the Rt. Hon. Lord Swaythling, Southampton. See p. 447.

To Lilium 'Fire King' as a hardy flowering plant (votes 17 for, 1 against), from J. E. H. Stooke, Esq., Hereford. See p. 447.

To Lilium giganteum as a hardy flowering plant (votes unanimous), from the Rt. Hon. Lord Swaythling, Southampton. See p. 447.

To Trachelospermum jasminoides as a hardy flowering shrub (votes 12 for), from Mrs. W. J. H. Whittall, Haslemere. See p. 405.

Preliminary Commendation.

To Evolvulus alsinoides as a hardy flowering plant (votes unanimous), from T. Hay, Esq., Hyde Park.

Other Exhibits.

Lord Aberconway, Bodnant: Aristaea lucida, Carrierea calycina.

R. Berkeley, Esq., Worcester: Sempervivum tabulaeforme.

Miss E. A. Britton, Tiverton: alpine plants.

Burnham Lily Nursery, Ltd., Burnham: Lilium callosum. Viscountess Byng of Vimy, Thorpe-le-Soken: Lilium regale. The Earl of Darnley, Cobham, Kent: Lilium regale.

Messrs. C. Elliott, Stevenage: Oliveranthus elegans. Guy Fenwick, Esq., Stamford: Lilium testaceum.

Mark Fenwick, Esq., Stow-on-the-Wold: Lilies, Deutsia setchuenensis.

T. Hay, Esq., Hyde Park: Eryngium giganteum, Cyananthus pedunculatus var. crenatus, Cyananthus microphyllus.

The Misses Hopkins, Coulsdon: rock plants.

Lord Horder, Petersfield: Lilies.

Lady Leconfield, Petworth: Fabiana imbricata, Coriaria terminalis var. anthocarpa, Deutzia longifolia.

Mrs. Leonard Lees, Brecon: Lilies.

The Hon. Mrs. Sebag Montifiore, Plymou h; Aster sp. Forrest 30644.

CCIV PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

J. Montagu, Esq., Oakham: Lilies. Lt.-Col. G. S. F. Napier, Horeham Road: Lilium × 'Sacajawa,' L. × 'Shukshan.

Owermoigne Nurseries, Dorchester: alpine plants.

Lionel de Rothschild, Esq., Exbury: Ozothamnus rosmarinifolius, O. rosmarinifolius var. ericifolius.

Messrs. L. R. Russell, Richmond: Habrothamnus purpureus var. Smithii. Begonia Rex.

Viscountess St. Cyres, Lymington: Callistemon phoeniceus, Lilium Grayi.

Lt.-Col. Spender-Clay, Lingfield: Lilies.

Messrs. Stark, Fakenham: Linum campanulatum.

F. C. Stern, Esq., Highdown, Goring-by-Sea: Lilium Grayi.

Dr. and Mrs. Fred Stoker, Loughton: Lilies.

J. E. H. Stooke, Esq., Hereford: Lilies. J. C. Watt, Esq., Aberdeen: Lilium nepalense var. primulinum. Mrs. W. J. H. Whittall, Haslemere: Nothofagus obliqua, Gleditschia triacanthos, Alangium platanifolium.

Mrs. Wightman, Bengeo, Hertford: Lilies.

July 26, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Lindley Medal.

To Mr. T. M. Endean, Laindon, for a group of species of Apicra and Haworthia. Flora Medal.

To Messrs. L. R. Russell, Richmond, for Nymphaeas.

Banksian Medal.

To Mr. W. A. Constable, Southborough, for Lilies.

To Mr. T. M. Endean, for Cacti and other succulents.

To Mr. Amos Perry, Enfield, for Hemerocallis.

First-class Certificate.

To Mutisia decurrens, Comber's form as a hardy flowering climber (votes 11 for. 2 against), from Lord Aberconway, Bodnant. See p. 448.

Award of Merit.

To Hibiscus 'President' as a greenhouse flowering shrub (votes 14 for), from Lionel de Rothschild, Esq. See p. 446.

To Lilium Davidi var. macranthum as a hardy flowering plant (votes 13 for).

from C. P. Raffill, Esq., Kew. See p. 447.

To Lilium × princeps var. 'G. C. Creelman' as a hardy flowering plant (votes 10 for), from Mr. W. A. Constable, Southborough. See p. 447.

To Malpighia coccigera as a hardy flowering plant for the warm greenhouse (votes unanimous), from the Curator, Chelsea Physic Garden, Chelsea. See p. 448. Other Exhibits.

Lord Aberconway, Bodnant: Crinum hybrid Muller No. 1. Burnham Lily Nursery, Burnham: Lilium neilgherrense.

Col. S. R. Clarke, Haywards Heath: *Indigofera* sp. Forrest 28462. Mr. W. A. Constable, Southborough: Lilium 'Crow's Hybrid.'

The Misses Hopkins, Coulsdon: rock plants.

Collingwood Ingram, Esq., Benenden: Wahlenbergia sp. Knap Hill Nursery, Ltd., Woking: Erica cinerea 'Eden Valley Variety.'

Mr. Ernest Ladhams, Elstead: Buddleia hybrids.

Mrs. R. L. Newman, Dartmouth: Lilium longiflorum.

Messrs. Prichard, Christchurch: Campanula lanata, Erica 'Rodney.'

The Director, R.H.S. Gardens: Campanula argyrotricha.

Mr. J. Robinson, Eltham: rock plants.

L. de Rothschild, Esq., Exbury: Sambucus canadensis.

Messrs. Russell, Richmond: Columnea magnifica, Pavonia Wiotii.

August 28, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :--

Lindley Medal.

To Mr. Amos Perry, Enfield, for aquatic plants.

Flora Medal.

To Messrs. Cheal, Crawley, for shrubs.

Banksian Medal.

To Messrs. Prichard, Christchurch, for rock plants.

To Mr. J. Robinson, Eltham, for rock plants.

To Messrs. L. R. Russell, Richmond, for stove plants.

Award of Merit.

To Gentiana x 'Inez Weeks' as a hardy flowering plant for the rock garden (votes 12 for), from A. G. Weeks, Esq., Limpsfield Common. See p. 446.

To Gentiana × wealdensis as a hardy flowering plant for the rock garden

(votes 14 for), from A. G. Weeks, Esq., Limpsfield Common. See p. 446.

To Nymphaea ' Jupiter ' as an aquatic flowering plant (votes 13 for), from Lionel de Rothschild, Esq., Exbury. See p. 448.

Other Exhibits.

Hiatt C. Baker, Esq., Almondsbury: Cotoneaster sp. T. Hay, Esq., Hyde Park, W.: Stokesia cyanea robusta. The Misses Hopkins, Coulsdon: rock plants.

Mr. Amos Perry, Enfield: Nymphaea' Col. Lindbergh.'

Messrs. Russell, Ltd., Richmond: Ixora Westii.
The Hon. Mrs. Sebag Montifiore, Plymouth: Billardiera longifiora.

H. J. Talbot, Esq., Ickenham: Pentstemon cordifolius.
The Director, R.H.S. Gardens, Wisley: Strobilanthes atropurpureus.

ORCHID COMMITTEE.

June 12, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

No awards were recommended.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Black & Flory, Slough, for a group. To Messrs. McBean, Cooksbridge, for a group.

To Messrs. Sander, St. Albans, for a group.

To Messrs. Stuart Low, Jarvis Brook, for a group.

June 19, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

Award of Merit.

To Sophrolaeliocattleya × 'Cibola,' Prinsep's var. (C. × 'Tityus' × S.-l.-c. × 'Edna') (votes 9 for), from N. Prinsep, Esq., The Boxes, Pevensey Bay, Sussex. See p. 404.

June 26, 1934, Sir Jeremiah Colman, Bt., in the Chair, and nine other members present.

Award of Merit.

To Odontioda x 'Victor' var. 'Fire King' (votes 6 for), from N. Prinsep,

To Phalaenopsis x Elisabethae (votes 8 for, 1 against), from Messrs. Armstrong

& Brown. See p. 448.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a group.

July 10, 1934, Sir Jeremiah Colman, Bt., in the Chair, and twelve other members present.

Preliminary Commendation.

To Miltonia x 'Limelight' var. 'Princess Royal' (Armstrongii x 'Lycaena') (votes 12 for), from Messrs. Armstrong & Brown, Tunbridge Wells. A promising seedling, with a well-formed flower of ruby-crimson colour.

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Bulbophyllum Leopardinum with 29 flowers.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group.

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July 24, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

Award Recommended :-

Cultural Commendation.

To Messrs. Charlesworth, Haywards Heath, for Odontoglossum × 'Isolene' ('Georgius Rex' x 'Tityus') (10 for, 1 against), with a spike of ten large flowers and six buds.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group.

August 14, 1934, Dr. F. CRAVEN MOORE in the Chair, and nine other members present.

Exhibit.

W. J. Burstow, Esq., Haywards Heath: Cymbidium suavissimum.

August 28, 1934, Dr. F. Craven Moore in the Chair, and five other members present.

No awards were recommended.

Exhibits.

A. M. Gentle, Esq., St. Albans: Angraecum Eichlerianum.

Messrs. Charlesworth, Haywards Heath: Odontonia × 'Nesta.'
Messrs. H. G. Alexander, Tetbury: Laeliocattleya × 'Adonis' and L.-c. × 'Berenice.'

LIST OF DONATIONS TO THE SOCIETY'S GARDENS, 1933 (cont.).

Burrell & Co., Messrs., Cambridge; Dahlias for trial. Burton, F., Hildenborough, Kent; Iris for trial. Burler, E. D., Kuala Lumpur, F.M.S.; Miquelia caudata. Button, C., Cranham; Abyssinian Primula. Buxton, B. H., Byfleet; Senecio elgonensis. Buxton, Mrs. K., Sawbridgeworth; Melon seeds. Byng of Vimy, The Rt. Hon. Viscountess, Thorpe-le-Soken; Collection of plants and seeds. Calvert, R. F., Cornwall; Narcissus for trial. Carters TESTED SEEDS, Messrs., Raynes Park, S.W. 20; Carrots, Spinach, Tagetes, Calendulas, Cineraria, Calceolaria, for trial; and collection of seeds. Chadburn, H., Saxmundham; Irises for trial. Chapman, F. Herbert, Peasmarsh, Sussex; Daffodil for trial. Cheal & Sons, Ltd., Messrs. J., Crawley; Dahlias for trial. Chelsea Physic Garden, London; Collection of Iris seeds, Echium vulgare. Chittenden, F. J., West Clandon, Surrey; Cuttings and seeds of Campsis radicans, Oenothera fruticosa, Blackberry. Christy, W. M., Chichester; Yucca Whipplei. Clarke, Messrs., Dover; Alstroemeria for trial. Clayton, Miss K. Brown, London; 1 plant of Musk. Clucas, Ltd., Messrs. J. L., Miss K. Brown, London; I plant of muss. Clocks, Lie, Missis, J. 2., Ormskirk; Spinach, Carrots, Tagetes, Calendulas, for trial. Cobb, A. J., Reading; Dahlias for trial. Cohen, Mrs. E., Exeter; Lavandula latifolia. Combra Botanic Garden, Portugal; Collection of seeds. Coleman, C. F., Crandrook: Dioscorea pyrenaica. Colledge, J. D., Jersey, C.I.; Viola? Cranbrook; Dioscorea pyrenaica. Colledge, J. D., Jersey, C.I.; Viola? COMBER, J., Handcross; Ourisia microphylla. COOKE, R. B., Corbridge-on-Tyne; Collection of seeds. Copeland, T., Wokingham; Gentiana sino-ornata (striped var.). Copenhagen Botanic Garden; Collection of seeds. Corder, (striped var.). COPENHAGEN BOTANIC GARDEN; COLLEGION OF SECULD CORREVON, H., Bridgewater; Primula Palinuri, Saxifraga sp. (Tyrol). CORREVON, H., Geneva, Switzerland; Collection of seeds. Cousins, F. G., Torquay; Hips unknown; berries of Solanum aviculare. Cox, E. H. M., Perthshire; Collection of plants. Crabbe, Mrs., Tunbridge Wells; Seeds from Sudan. Cranfield, W. B., Enfield; Narcissi for trial. Cuckney, Squadron Leader E. J., Iraq.; Collection of seeds and bulbs. DAEHNFELDT & JENSEN, LTD., Messrs., Denmark; Calendulas, Carrots, Spinach, for trial. Daniels Bros., Messis., Norwich; Calendulas, Tagetes, Carrots, Spinach, for trial. Darmstadt Botanic Garden; Collection of seeds. Dawkins, Messis. A., Chelsea; Primula, Spinach, Carrots, Tagetes, Marigolds, for trial; Tomato 'Heterosis.' De Graaff-Gerharda, Messis., Holland; Narcissi for trial. Dent, W., Moulton; Daffodil for trial. DE ROTHSCHILD, LIONEL, Exbury; Rhododendron burmanicum, R. cilicalyx, Carrots, Spinach, Marigold, for trial; and 50 Roses' Pink Delight.' Dopp., Mrs., Bracknell; Dahlias for trial: Donard Nursery Co., The., Co. Down; 250 Narcissi assorted. Douglas, J., Great Bookham; Auricula plants. Dresden Botanic Garden; Collection of seeds. Duncan, G., Isleworth; Collection of seeds. of seeds. Dunedin Botanic Garden, New Zealand; Collection of seeds.

EARLE, Mrs. M., Godalming; Abies recurvata. Edinburgh Royal Botanic Garden; Collection of plants, cuttings and seeds. Elliott, Clarence, Steven-GARDEN; Collection of plants, cuttings and seeds. ELLIOTT, CLARENCE, Stevenage, Herts.; Aster for trial, Berberis linearifolia, Pyxidanthera barbulata. ENGLEMAN, Mrs., Saffron Walden; Pansy plants 'Old English Strain.' EVERETT, T. H., New York, U.S.A.; Collection of seeds. Fenwick, Guy, Stamford; Cuttings of Salvia tricolor, plants of Iris ruthenica. Fenwick, Mark, Stow-on-the-Wold; Deinanthe coerulea, Lilium pardalinum, Schizostylis coccinea 'Mrs. Hegarty.' Ferry Morse Seed Co., California; Carrots, Marigold, Calendulas, for trial. Foewills Ltd., Messrs., Guildford; Carrot for trial. Frewen, O., Sussex; Mock Erica, Scarlet Iris. Fromow, Messrs., Windlesham; Carpinus Betulus var. pyramidalis. Game, Lady, Sydney; Palm seeds. Gaut, R. C., Worcester; Grafts of Apple 'Renown.' Garden Supplies Ltd., The, Liverdool; Ludin for trial. Garden Hon. Mrs. Alan., Worplesdon: Thladi-Liverpool; Lupin for trial. GARDNER, Hon. Mrs. Alan., Worplesdon; Thladiantha Oliveri. GEMMELL & Co., Messis. R. K., Glasgow; Marigold for trial. GIBBARD, L. M., Esher; Clianthus puniceus, Physalis edulis. GIBSON & AMOS, Messrs., Cranleigh; Dahlias for trial. GIBSON & Co., Messrs., Cranleigh; Dahlias for trial. Fuchsias for trial. Glissophia for trial. Glisson & Co., Messix. G., Leeling Bar; Fuchsias for trial. Glissophia for trial. Glissophia for trial. Glissophia for trial. Glissophia for Gollection of plants and seeds. Godman, Dame Alice, Horsham; Collection of plants and seed of Salvia bicolor. Goude, H., Norfolk; Apple 'Norfolk Royal.' Gould, G. W., Nottingham; Roscoea Humeana. Graham, Lt.-Col. C. L., Co. Kildare; Plant to be grown for naming. Greg, Lt.-Col. Alex., Liphook; Plants of Rhodoendron Nobleanum. Gresham, Major C. E., Cairo; Collection of seeds. Grey, Lt.-Col. C. H., Cranbrook; Collection of seeds and plants. Harley, A., Kirkcaldy; Collection of seeds. of seeds. Harrison & Sons, Messrs., Leicester; Calendulas, Carrots, Spinach, for trial. Harrison & Sons, Messrs., Maidstone; Calendulas, Marigolds, Carrots, Spinach, for trial. Harchell, D. G., Milton-under-Wychwood; Buds of seedling Spinach, for trial. HATCHELL, D. G., Milton-under-Wychwood; Buds of seedling Apple. HAWKER, Capt. H., Ermington, Devon; Delphinium Welbyi. HAY, T., Hyde Park, London; Collection of seeds. HAYWARD, Messrs., Clacton-on-Sea; Physostegias for trial. HEADFORT, Marquess of, Co. Meath; Collection of plants. HEINEMAN, Messrs. F. C., Germany; Carrots, Spinach, for trial. HELLINGS, F. WYNN, Richmond; Iris aphylla. HERB, Messrs. M., Italy; Melon seed. HERLOTS, G. A. C., Hong-Kong; Collection of seeds. HEWITTS, Messrs., Solihull; Delphiniums for trial. HOKKAIDO IMPERIAL UNIVERSITY, Sapporo, Japan; Collection of seeds. HOLMES, J., Renfrewshire; Orchis foliosa. HOSKINS, Mr., Guildford; Collection of plants. HURST & Son, Messrs., Houndsditch, London; Marigolds, Calendulas, Spinach, Carrots, Primula, Cineraria, for trial. HURST & Son, Messrs., Kelvedon: Marigold for trial. INGWERSEN. LTD. HURST & SON, Messis., Kelvedon; Marigold for trial. INGWERSEN, LTD., Messis. W. E. Th., East Grinstead; Calluna vulgaris elegantissima. INNS-Messis. W. E. Th., East Grinstead; Calluna vulgaris elegantissima. Innsbruck Botanic Garden; Collection of seeds. Jassy University Botanic Garden, Roumania; Pentstemon Braddurii, Potentilla montenegrina, P. pilosa, P. Wrangeliana. Jekyll, F., Godalming; Collection of seeds. Jenkins, Dr., Hindhead; Collection of plants and cuttings. Jenkinson, Captain R. C., Knaphill; Helleborus trifoliatus × corsicus. John Innes Horticultural Institution, Merton, S.W. 19; Primula for trial. Johnson, A. T., Conway, N. Wales; Ceanothus floribundus Hookeri, Geranium anemonifolium, Cistus villosus albus. Johnson & Son, Ltd., Messis, Boston; Calendula, Cartots, Spinach, for trial. Jonas, A., Fordingbridge; Bignonia sp. Kelway & Son, Ltd., Messis. J., Langport; Delphiniums, Oenotheras, for trial. Kench, Mr., Weybridge; Saxifraga Strachyii (afghanica). Kent. G., Balcombe: Digitalis bridge; Saxifraga Strachyii (afghanica). Kent, G., Balcombe; Digitalis plants. Kerr & Co., Messrs., Glasgow; Carrots for trial. Kew Royal Botanic Garden; Collection of plants and seeds. Kirstenbosch National Botanic Garden; Collection of seeds. Königsberg Botanic Garden; Collection tion of seeds. Lamb, George, Swanley; Apple grafts 'Lamb's Seedling.' La MORTOLA, Italy; Collection of seeds. Lawrence, Sir Wm., Dorking; Iris setosa. LEATHES, Mrs. CARTERET, Oxford; Tulip seeds. LEMPERG, Dr. FRITZ, Hatzendorf; Collection of seeds. LENINGRAD BOTANIC GARDEN, Russia; Collection of seeds. LEXINGTON BOTANIC GARDENS, Mass., U.S.A.; Collection of seeds. LILLYWHITE, W. E., Canterbury; 22 rooted tips Blackberry Black Diamond for trial. LILY COMMITTEE, THE, R.H.S. Hall, Westminster; Lilium Heldreichii. LINLITHGOW, The Marchioness of, Ascot; Carnation for trial. LODER, G. W., Ardingly; Collection of seeds, seedlings and plants. Lofthouse, T. Ashton, Middlesbrough; Collection of seeds, seedlings and plants. Long, E., New Delhi, per Colonel Durham; Lilium polyphyllum. Long, E. R., Port Elizabeth, S. Africa; Collection of seeds. Longstaff & Sons, Messrs., London; Gladioli for trial. Low & Co., Messrs. Stuart, Enfield; 3 trees of Apple 'Howgate Wonder'; plants of Camellias. Lower, P., Harpenden; Daffodils for trial. Lowndes, Capt. D. G., United Province, India; Primula Stuartii. Lukin, Mrs., Burghfield Common, Berks.; Seeds, plants, bulbs and Sedums. Lund Botanic GARDEN, Sweden; Collection of seeds. LUPTON, Miss E. M., Roundhay; Seeds July 24, 1934, Sir Jeremiah Colman, Bt., in the Chair, and thirteen other members present.

Award Recommended :--

Cultural Commendation.

To Messrs. Charlesworth, Haywards Heath, for Odontoglossum × 'Isolene' ('Georgius Rex' × 'Tityus') (10 for, 1 against), with a spike of ten large flowers and six buds.

Vote of Thanks.

To Messrs. Charlesworth, Haywards Heath, for a group.

 $\ensuremath{\textit{August}}$ 14, 1934, Dr. F. Craven Moore in the Chair, and nine other members present.

Exhibit.

W. J. Burstow, Esq., Haywards Heath: Cymbidium suavissimum.

August 28, 1934, Dr. F. CRAVEN MOORE in the Chair, and five other members present.

No awards were recommended.

Exhibits.

A. M. Gentle, Esq., St. Albans: Angraecum Eichlerianum.

Messrs. Charlesworth, Haywards Heath: Odontonia × 'Nesta.'

Messrs. H. G. Alexander, Tetbury: Laeliocattleya × 'Adonis' and L.-c. × 'Berenice.'

LIST OF DONATIONS TO THE SOCIETY'S GARDENS, 1933 (cont.).

Burrell & Co., Messis, Cambridge; Dahlias for trial. Burton, F., Hildenborough, Kent; Iris for trial. Butler, E. D., Kuala Lumpur, F.M.S.; Miguelia caudata. Button, C., Cranham; Abyssinian Primula. Buxton, B. H., Bytheet; Senecio eigonensis. Buxton, Mrs. K., Sawbridgeworth; Melon seeds. Byng of Vimy, The Rt. Hon. Viscountess, Thorpe-le-Soken; Collection of plants and seeds. Calvert, R. F., Cornwall; Narcissus for trial. Carters Tested Seeds. Calvert, R. F., Cornwall; Narcissus for trial. Carters Tested Seeds. Calvert, R. F., Cornwall; Narcissus for trial. Carters, Calendulas, Cineraria, Calceolaria, for trial; and collection of seeds. Chadburn, H., Saxmundham; Irises for trial. Chapman, F. Herrer, Peasmarsh, Sussex; Daffodil for trial. Cheal & Sons, Ltd., Messis, J., Crawley; Dahlias for trial. Chelse A Physic Garden, London; Collection of Iris seeds, Echium vulgare. Chittenen, F. J., West Clandon, Surrey; Cuttings and seeds of Campsis vadicans, Oenothera fruitioss, Blackberry. Christy, W. M., Chichester; Yucca Whipplei. Clarke, Messis, Dover; Alstroemeria for trial. Clayton, Miss K. Brown, London; I plant of Musk. Clucas, Ltd., Messis, L., Ormskirk; Spinach, Carrots, Tagetes, Calendulas, for trial. Cobb, A. J., Reading; Dahlias for trial. Cohen, Mrs. E., Exeter; Lavandula latifolia. Combra Botanic Garden, Portugal; Collection of seeds. Coleman, C. F., Cranbrook; Dioscorea pyrenaica. Collection of seeds. Coleman, C. F., Cranbrook; Dioscorea pyrenaica. Collection of Seeds. Coleman, C. F., Cranbrook; Dioscorea Pyrenaica. Collection of Seeds. Corner, H., Bridgewater; Primula Palinuri, Saxifraga sp. (Tyrol). Correvon, H., Geneva, Switzerland; Collection of Seeds. Corner, H., Bridgewater; Primula Palinuri, Saxifraga sp. (Tyrol). Correvon, H., Geneva, Switzerland; Collection of Seeds. Covener, H., Bringewater; Primula Palinuri, Saxifraga sp. (Tyrol). Correvon, H., Geneva, Switzerland; Collection of Seeds. Covener, Collection of Seeds. Dawkins, Messis, A., Chelsea; Primula, Spinach, Carnots, Spinach, for trial. Danner

EARLE, Mrs. M., Godalming; Abies recurvata. Edinburgh Royal Botanic Garden; Collection of plants, cuttings and seeds. Elliott, Clarence, Steven-GARDEN; Collection of plants, cuttings and seeds. ELLIOTT, CLARENCE, Stevenage, Herts.; Aster for trial, Berberis linearifolia, Pyxidanthera barbulata. Engleman, Mrs., Saffron Walden; Pansy plants 'Old English Strain.' EVERETT, T. H., New York, U.S.A.; Collection of seeds. Fenwick, Guy, Stamford; Cuttings of Salvia tricolor, plants of Iris ruthenica. Fenwick, Mark, Stow-on-the-Wold; Deinanthe coerulea, Lilium pardalinum, Schizostylis coccinea 'Mrs. Hegarty.' Ferry Morse Seed Co., California; Carrots, Marigold, Calendulas, for trial. Fogwills Ltd., Messrs., Guildford; Carrot for trial. Frewen, O., Sussex; Mock Erica, Scarlet Iris. Fromow, Messrs., Windlesham; Carroting Betulus var devaguidalis. Carrot Land Sydney. Palm seeds. California. Carpinus Betulus var. pyramidalis. GAME, Lady, Sydney; Palm seeds. GAUT, R. C., Worcester; Grafts of Apple 'Renown.' GARDEN SUPPLIES LTD., THE, Liverpool; Lupin for trial. GARDNER, Hon. Mrs. Alan., Worplesdon; Thiadiantha Oliveri. GEMMELL & Co., Messrs. R. K., Glasgow; Marigold for trial. GIBBARD, L. M., Esher; Clianthus puniceus, Physalis edulis. GIBSON & AMOS, Messrs., Cranleigh; Dahlias for trial. Gibson & Co., Messrs. G., Leeming Bar; Fuchsias for trial. Giuseppi, Dr., Felixstowe; Collection of plants and seeds. Godman, Dame Alice, Horsham; Collection of plants and seed of Salvia bicolor. Goude, H., Norfolk; Apple 'Norfolk Royal.' Gould, G. W., Nottingham; Roscoea Humeana. Graham, Lt.-Col. C. L., Co. Kildare; Plant to be grown for naming. Greg, Lt.-Col. Alex., Liphook; Plants of Rhododendron Nobleanum. GRESHAM, Major C. E., Cairo; Collection of seeds. GREY, Lt.-Col. C. H., Cranbrook; Collection of seeds and plants. HARLEY, A., Kirkcaldy; Collection of seeds. HARLEY, A., Kirkcaldy; Collection of seeds. Harrison & Sons, Messrs., Leicester; Calendulas, Carrots, Spinach, for trial. Harrison & Sons, Messrs., Maidstone; Calendulas, Marigolds, Carrots, Spinach, for trial. Harchell, D. G., Milton-under-Wychwood; Buds of seedling Apple. Hawker, Capt. H., Ermington, Devon; Delphinium Welbyi. Hav, T., Apple. HAWKER, Capt. H., Ermington, Devon; Delphinium Welbyi. HAY, T., Hyde Park, London; Collection of seeds. HAYWARD, Messrs. Clacton-on-Sea; Physostegias for trial. HEADFORT, Marquess of, Co. Meath; Collection of plants. HEINEMAN, Messrs. F. C., Germany; Carrots, Spinach, for trial. HELLINGS, F. WYNN, Richmond; Iris aphylla. HERB, Messrs. M., Italy; Melon seed. HERKLOTS, G. A. C., Hong-Kong; Collection of seeds. HEWITTS, Messrs., Solihull; Delphiniums for trial. HOKKAIDO IMPERIAL UNIVERSITY, Sapporo, Japan; Collection of seeds. HOLMES, J., Renfrewshire; Orchis foliosa. HOSKINS, Mr., Guildford; Collection of plants. HURST & SON, Messrs., Houndsditch, London; Marigolds Calendulas Spinach Carrots Primula Cineraria for trial London; Marigolds, Calendulas, Spinach, Carrots, Primula, Cineraria, for trial. HURST & SON, Messrs., Kelvedon; Marigold for trial. Ingwersen, LTD., Messrs. W. E. Th., East Grinstead; Calluna vulgaris elegantissima. Innsbruck Botanic Garden; Collection of seeds. Jassy University Botanic Garden, Roumania; Pentstemon Bradburii, Potentilla montenegrina, P. pilosa, P. Wrangeliana. Jekyll, F., Godalming; Collection of seeds. Jenkins, Dr., Hindhead; Collection of plants and cuttings. Jenkinson, Captain R. C., Knaphill; Helleborus trifoliatus × corsicus. John Innes Horticultural Institution. TUTION, Merton, S.W. 19; Primula for trial. Johnson, A. T., Conway, N. Wales; Ceanothus floribundus Hookeri, Geranium anemonifolium, Cistus villosus albus. Johnson & Son, Ltd., Messrs., Boston; Calendula, Carrots, Spinach, for trial. Jonas, A., Fordingbridge; Bignonia sp. Kelway & Son, Ltd., Messrs. J., Langport; Delphiniums, Oenotheras, for trial. Kench, Mr., Weybridge; Saxifraga Strachyii (afghanica). KENT, G., Balcombe; Digitalis plants. KERR & Co., Messrs., Glasgow; Carrots for trial. KEW ROYAL BOTANIC GARDEN; Collection of plants and seeds. KIRSTENBOSCH NATIONAL BOTANIC GARDEN; Collection of seeds. KÖNIGSBERG BOTANIC GARDEN; Collection tion of seeds. Lamb, George, Swanley; Apple grafts 'Lamb's Seedling.' MORTOLA, Italy; Collection of seeds. Lawrence, Sir Wm., Dorking; Iris setosa. Leathes, Mrs. Carteret, Oxford; Tulip seeds. Lemperg, Dr. Fritz, Hatzendorf; Collection of seeds. Lexingrad Botanic Garden, Russia; Collection of seeds. Lexingrad Botanic Gardens, Mass., U.S.A.; Collection of seeds. LILLYWHITE, W. E., Canterbury; 22 rooted tips Blackberry Black Diamond for trial. LILY COMMITTEE, THE, R.H.S. Hall, Westminster; Lilium Heldreichii. LINLITHGOW, The Marchioness of, Ascot; Carnation for trial. LODER, G. W., Ardingly; Collection of seeds, seedlings and plants. Lofthouse, T. Ashton, Middlesbrough; Collection of seeds, seedlings and plants. Long, E., New Delhi, per Colonel Durham; Lilium polyphyllum. Long, E. R., Port Elizabeth, S. Africa; Collection of seeds. Longstaff & Sons, Messrs., London; Gladioli for trial. Low & Co., Messrs, Stuart, Enfield; 3 trees of Apple 'Howgate for trial. Low & Co., Messrs. STUART, Enfield; 3 trees of Apple 'Howgate Wonder'; plants of Camellias. Lower, P., Harpenden; Daffodils for trial. Lowndes, Capt. D. G., United Province, India; Primula Stuartii. LUKIN, Mrs., Burghfield Common, Berks.; Seeds, plants, bulbs and Sedums. LUND BOTANIC GARDEN, Sweden; Collection of seeds. LUPTON, Miss E. M., Roundhay; Seeds

of Monkshood. Lyon Botanic Garden; Collection of seeds. Macaulay, R. H., Argyll; Collection of plants. MacDonald Seed Co., California; Calendulas, Marigolds, for trial. McEwen, Brigadier-General D., Dalbeattie; *Primula* Gockburniana. McGregor, James, Glasgow; Collection of plants and seeds. McLeod, Mrs. F. A., British Columbia, Canada; Tulips. McWatt, Dr., Duns, Scotland; Plants of Primulas. Marchant, W. J., Nr. Wimborne; Gaultheria furens (Pernettya ciliaris?), Pyrus arbutifolia erecta. Martineau, Lady, Ascot; Kalanchoe tubiflora, Lilium philippinense. Marshall, Mis., Ambleside; Notospartium Carmichaeliae. Meyer, The Rev. Rollo, Hertford; Irises for trial. Miles, W., Ontario; Iris foliosa, I. Hookeri. Millard, W. S., Tunbridge Wells; Guaiacum officinale. Miln & Co., Messrs., Chester; Carrot, Tagetes, for trial. Milner, Bt., Sir W., Shipton, Yorks.; Primula modesta var. alba. MITRA, N., Calcutta; Collection of seeds. Morris, R. A., Birmingham; Marigolds, Calendulas, Spinach, Carrots, for trial. Morron Arboretum, Illinois, U.S.A.; Collection of seeds. Mulligan, B. O., Belfast; Buddleia auriculata, Escallonia virgata (Philippiana), Salix caprea xlanata, S. daphnoides var. Algaia, Sorbus Wilsoniana, Cyananthus lobatus K.W. var. MÜNCHEN BOTANIC GARDEN; Campanula abictina, Primula lacteocapitata, P. obliqua. Musgrave, C. T., Godalming; Collection of plants, seedlings and seeds. Nanking Botanic Garden, China; Collection of seeds. Napier, Colonel, Horeham Road, Sussex; Dracaena Draco. New York Botanic Garden; Collection of Irises. Nitzan, J., Minories and Palestine; Collection of bulbs and plants. Norton, J.: L., East London, S. Africa; Collection of seeds. Notcutt, R. C., Woodbridge; Collection of plants. Nutting & Sons, Messrs., London; Spinach, Carrots, Marigold, Calendula, for trial. Ohlsens Euke, Messrs. J. E., Denmark; Carrots, Spinach, Calendula, Tagetes, for trial. Orington Nursery Co., Messrs., Kent; Irises for trial, and Iris aphylla, I. Sou. de Mme. Gaudichau × aphylla. Oslo Botanic Garden; Collection of seeds. Osmaston, A. E. Billingsburst: Collection of seeds. Palmer R. M. British OSMASTON, A. E., Billingshurst; Collection of seeds. Palmer, R. M., British Columbia; Gladioli for trial. Pam, Major A., Broxbourne; Pamianthe peruviana, Marica coerulea. Pannell, F. W., Dunmow; Dahlia for trial. Parks, Dickson, Flaxwell Heath; Anemone sylvestris, Magnolia Lennei. Pearson & Sons, Messis. J. R., Nottingham; Daffodils, Calendulas, Marigolds, for trial. PECKHAM, Mrs. E. A. S., New Rochelle, U.S.A.; Irises for trial. Perry, Messrs. A., Enfield; Collection of plants and seedlings. Pritzer, Wilhelm, Germany; Tagetes, Calendulas, Spinach, Carrots, for trial. Phillips, Major W. J., S. Rhodesia; Seeds of blue, white and rosy flowers, names unknown. Pilkington, G. L., Liverpool; Irises for trial. Pinnock, F., Ripley; Iris germanica type. Pitts-BURGH, UNIVERSITY OF, U.S.A.; Collection of seeds. PORTER. J. W., Co. Down; Calluna vulgaris var. POTTER, Mrs. C., Brockenhurst; Dahlia for trial. POTTS, Dr., Leatherhead; Rose Climbing Devoniensis. PRESTON, F. G., Cambridge; Iris aphylla. PRICHARD & SONS, LTD., Messrs. M., Christchurch; Oenotheras, Phloxes, for trial. PRITCHARD, W. H., Corsham; Dahlia for trial. PYE, F. E. E., Phloxes, for trial. PRITCHARD, W. H., Corsham; Dahlia for trial. Pye, F. E. E., Bognor Regis; Clematis ligusticifolia, Lilium philadelphicum, Prenanthus albus from Canada. RAFFILL, C. P., Richmond; Lilium Davidi, Nomocharis nana. RANDALL, Mrs. HILLINGDON, per Mr. F. J. CHITTENDEN, R.H.S. Hall, Westminster; Kurrajong Tree, Quandong Tree (a species of Acacia). RAWLINGS, Commander H. B., India; Wild Clematis from Yugo-Slavia, Iris from Malta. REED, Dr. G. M., Brooklyn, U.S.A.; Iris aphylla. RENTON, R. J., Perth; Collection of plants and seeds. RICHARDSON, J. L., Waterford, Ireland; Daffodils for trial. ROEMER, Messrs. F., Germany; Tagetes, Calendulas for trial, and Pansies and Petunias. ROSENHEIM, P., East Molesey; Iris anglica = xiphioides, Lilium bulbiferum, Nomocharis pardanthina. ROWAN, Mrs. A. HAMILTON, Bletchingley; Irises for trial. RYDER & SON, Messrs., St. Albans; Marigold, Calendulas, Carrots, Spinach, for trial. SAKATA & Co., Messrs. T., Hamilton, Bletchingley; Irises for trial. Ryder & Son, Messis., St. Aldais; Marigold, Calendulas, Carrots, Spinach, for trial. Sakata & Co., Messis. T., Japan; Petunias. Sanderman, F. D. Stewart, Kilgennie, Angus; Meconopsis Baileyi, seed of Primulas. Schomberg, R. C. F., Ross, Herefordshire; Turkestan Melon. Shoesmith, Junr., H., Woking; Chrysanthemum for trial. Simmonds, A., West Clandon; Caryopteris clandonensis, Clematis Viticella, Tulipa dasystemon. Simpson, A., Toronto; Helianthemum canadense, Lechea intermedia. Simpson, A. L., Cheam; Tsuga Albertiana. Simpson, Miss C. B., Wilmslow; Scilla bulbs for naming. Simpson & Sons, Messis. W. H., Birming-Bright Carrots. Spinach for trial. Skinner. ham; Primula, Lupines, Marigolds, Carrots, Spinach, for trial. Skinner, Lt.-Col. A. W. M. Campbell, Woking; Albizzia Julibrissin, Hibiscus sp. Sluis En Groot, Messrs., Holland; Marigolds, Calendulas, Spinach, Carrots. Smith, G. P. Darnell, Sydney; Castanospermum australe. Smith, R., Nr. Keighley, Yorks.; Gentiana ochroleuca, Mertensia maritima, Primula sinopurpurea. Smith, Squadron Leader C. A., Iraq, per Mr. F. J. Chittenden, R.H.S. Hall, Westminster; Bulbs and corms. Smith, T., Co. Down; Oenotheras for trial.

SOPPER, Colonel, Gorthleek, Inverness; Primula 'Red Hugh.' Southern, Frank, Manchester; Saxifraga labradorica. Speed & Sons, Messrs., Evesham; Carrots, Spinach, for trial. Spingarn, J. E., New York, U.S.A.; Clematis for trial. Spinks, G. T., Bristol; Cuttings of Blackcurrants 'Mendip Cross' and 'Cotswold Cross.' Stanford, Mrs. Hume, E. Transvaal, per Messrs. Sutton, Reading; Digitalis (Orchid pinky-mauve). STANIFORTH, G. W., Norfolk; Veratrum nigrum. STARK & SON, LTD., Messrs., Norfolk; Collection of Sidalceas. STEARN, F., R.H.S. Hall, Westminster; Gentiana Clusii. STERN, Major F. E. Goring-by-Sea; Irises for trial, and collection of plants and seeds. Stevenson Colonel, Ascot; Acer pennsylvanicum. Stockholm Botanic Garden; Collection of seeds. Stoker, Dr. F., Loughton; Ourisia elegans. Stookes, J. E. H., Hereford; Piptanthus nepalensis. Stout, Dr., New York; Hemerocallis for trial. Stredwick & Son, Messis. James, St. Leonards-on-Sea; Dahlias for trial. Sutton & Sons, Messis., Reading; Primulas for trial. Sutton & Sons, Messis., Reading, per Mr. A. Balfour; Nemesia sp. Namaqualand. Symons, A. J., Jersey; Jerusalem Artichokes (Round tubers). Tait, P. L., Quesnel Mountain, B.C., per Mr. F. J. Chittenden; Indian Paint Brush. Tate, Mis., Rye; Lilium regale. Taylor, M. C., Reigate; Campanula hypopolia. Taylor, W. P. G., Godalming; 8 pkts. of seeds. Therkildsen, K., Scuthport; Violas for trial. Thompson, H. P., Weybridge; Iris for trial. Thompson, Mis. H. P., Weybridge: Lilium Iankae var. bosniaca, Saxifraga Frederici-Augusti, Primula Colonel, Ascot; Acer pennsylvanicum. STOCKHOLM BOTANIC GARDEN; Collection trial. Thompson, H. P., Weybridge; Iris for trial. Thompson, Mrs. H. P., Weybridge; Lilium Jankae var. bosniaca, Saxifraga Frederici-Augusti, Primula deorum. Thomson, P. Murray, Hereford; Lilium testaceum × chalcedonicum and candidum, Primrose × Polyanthus. Thomson, F., Finchley; Anchusa Barrilieri, Sempervivum sps. Thornycroft, Lady, Bembridge, I. of W.; Grafts of Steyne Seedling. Todd, Colonel Enever, Edinburgh; Narcissus major. Tomalin, T. E., Rowland Castle; Grafts of Apples 'Sam Young,' 'Royal.' Toogood & Sons, Ltd., Messrs., Southampton; Calendula, Tagetes, Carrots, Spinach, for trial. Toronto, University of, Canada; Collection of seeds. Treseder, Ltd., Messrs. W., Cardiff; Dahlias for trial. Trintry College Botanic Garden, Dublin; Erodium Gussonii, Dianella tasmanica. Trotter, R. D., Ockley: Crocus biflorus sulphur Weldeni. C. chrysanthus E. A. Boyles R. D., Ockley; Crocus biflorus sulphur Weldeni, C. chrysanthus E. A. Bowles mixed hybrids, Koelreuteria bipinnata, Aralia chinensis mandschuricus, Scilla mixed hybrids, Koelreuteria bipinnata, Aralia chinensis mandschuricus, Scilla multiflora, Fritillaria pallidiflora. Troup, Capt. R., Dorchester; Euonymus europaeus. ? Unknown Donor; Pink Lily of the Valley. ? Unknown Donor; Double Aubretias. Unwin, F. W., Histon; Carrots, Marigolds, Tagetes, Calendulas, for trial. Uppsala University Botanic Garden, Sweden; Collection of seeds. Vanderschoot Ltd., J. B., Holland; Narcissi for trial. Van der Veld, Messis. G., Holland; Cartot, Spinach, for trial. Van Deursen, Messis., Holland; Daffodils for trial. Vienna Botanic Garden; Collection of seeds. Vilmorin-Andrieux & Cie, Messis., Paris; Collection of seeds. Wallace, Mrs. L'Estrange, Argentina; Seed of Tithonia. Waller Franklin Seed Co., California; Marigolds, Calendulas, for trial. Ward, Capt. Kingdon, Expedition. Collection of seeds. Warr, Capt., Egypt, per Mr. F. J. Chittenden; Laurentia tenella, Pæonia corallina, Saponaria cypria. Capt. Kingdon, Expedition. Collection of seeds. Warr, Capt., Egypt, per Mr. F. J. Chittenden; Laurentia tenella, Pæonia corallina, Saponaria cypria. Watkins & Simpson, Messis., Covent Garden, W.C. 2; Spinach, Cairots, Calceolarias, Marigolds, Tagetes, Calendula for trial and Calceolaria hybrida multiflora nana, Cineraria grandiflora semi-dwarf. Watt, J. Cromar, Aberdeen; Collection of plants and seeds. Watts, W. A., St. Asaph; Narcissi for trial. Webb & Sons, Messis. E., Stourbridge; Calendulas, Marigolds, Tagetes, Cairots, Spinach, for trial. Weeks, A. G., Limpsfield Common; Collection of plants and seeds. Weiss, Professor F. E., Merrow, Nr. Guildford; Collection of seeds and plants. Wells, Messis., Merstham; Oenotheras, Lupines, Delphiniums, for trial, and collection of plants and seedlings and seeds. West, J. T., Brentwood; Dahlias for trial. Whale, Mrs. T., Cornwall; Daffodils for trial. Wheeler, E. S., Bramley, Nr. Guildford; Lilium regale, L. superbum. White, H., Wimbledon; Collection of Rhododendrons. Williams, Dr. A. H., Horsham; Collection of seeds. Williams, J. G., Llandaff; Magnolia rustica rubra. Collection of seeds. WILLIAMS, J. G., Llandaff; Magnolia rustica rubra. WILLIAMS, J. C., Cornwall; Magnolia conspicua denudata var. purpurascens. WILLIAMS, P. D., Cornwall; Daffodils for trial. WILSON, A. M., Presteigne; Daffodils for trial. WILSON, E. K., per W. ALLISON, Wimbledon; Vitex Agnus-Dahlothis for trial. Wilson, G. L., Co. Antrim; Daffodils for trial. Wood, A. H., Oxford; Thladiantha Oliveri. Wood & Sons, Messrs., Taplow; Asters, Dahlias, for trial. Woodward, Major A. E. T., Bewdley; Aesculus turbinata, Picea rubra, Pinus resinosa. Yates & Sons, Messrs., Evesham; Spinach, Carrots, for trial. Zwaan & van der Molen, Messrs., Holland; Spinach, Carrots, for trial.

BOOKS AND PAMPHLETS PRESENTED, PURCHASED OR REVIEWED DURING THE HALF-YEAR ENDING JUNE 30, 1934, AND DEPOSITED IN THE LINDLEY LIBRARY.

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I = Sent for Review.
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- 2 = Purchased.
- 3 = Presented by the Author.
- 4 = ,, Mr. W. Bennett.
- 5 = ,, ,, the Regius Keeper, Royal Botanic Garden, Edinburgh.
- 6 = ,, ,, the University Botany School, Cambridge.
- 7 = ,, the University Library, Lund.
- 8 = ,, Mr. W. T. Stearn.

Abbreviations.—Col. pls. = coloured plates; illus. = illustrated or illustrator; ed. = editor, edited or edition; fol. = folio; trans. = translation.

For books published in London, the place of publication is not named in the entry.

- Anson, Sir Edward Reynell. The owner gardener. 8vo. 1934. (1)
- Appel, Otto. Ed. See Sorauer, P. Handbuch. 6th ed.
- Atanasoff, D. Virus diseases of plants, a bibliography. 8vo. Sofia, 1934. (2)
- Bakker, Titus J. Trans. See Dix, J. F. CH. Dutch bulbs.
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- Blatter, Ethelbert, & Millard, Walter Samuel. Some beautiful Indian trees.
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EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

NOTICES TO FELLOWS.

SUBSCRIPTIONS.

ALL Annual Subscriptions are payable in advance on January I of each year. Fellows can at any time relieve themselves of any further trouble in the matter, either by compounding by payment of a lump sum for life fellowship, or by obtaining from the Secretary a Banker's order, instructing their bankers to pay their subscription on January I each year.

CHANGE OF ADDRESS.

Fellows are reminded that it would be of material assistance to the Secretary in dispatching their tickets, plant distribution lists, JOURNAL or any other communications that may have to be addressed to them, if any change of address, or change in bankers through whom their subscriptions are paid, is notified to him as soon as possible.

PLANT DISTRIBUTION.

Lists of seeds and plants available for distribution in 1935, together with the form of application for them, will be distributed with the January JOURNAL. The application forms must be received on or before March 15, 1935, except from Fellows resident abroad. Should by any chance these lists and forms be mislaid, the Secretary would be obliged if Fellows would notify him immediately, so that a duplicate set of papers may be sent.

BOOK OF ARRANGEMENTS.

The usual Book of Arrangements which has appeared year after year, under the new arrangements for the JOURNAL will not appear in future. The January number of the JOURNAL will contain the essential information useful to Fellows with regard to the working of the Society, and the full regulations for exhibiting at shows, regulations for trials, etc., will be published separately, and will be sent on application to Fellows and others who desire to receive them.

THE CALENDAR.

December 12, 1934.—Fortnightly Meeting and Show, 1-5 P.M. At this last gathering of the year many horticultural friends meet to wish one another the best wishes of the year. The Society's Committees are particularly active making recommendations for the awards of the Society's annual medals. The names of the recipients will be published in the Annual Report. Generally speaking, the Show itself is representative of the available material at that time of the year. Orchids, fruit and perhaps some early bulbs will be seen. Besides pictures, etc., from the artist world garden sundries will be exhibited including garden ornaments, furniture, gates, labels, etc.

January 8, 1935.—Fortnightly Meeting and Show, I-5 P.M. Various bulbs and early spring flowers are likely to be shown, and among the Orchids exhibits

of Cypripediums are specially invited.

In the afternoon at 3.30 there will be a lecture in the Lecture Room of the New Hall, arranged by the Institute of Landscape Architects, by Mr. R. H. Mattocks, Dip.C.D. (Liverpool), on "The Park System and its place in the Town Plan."

January 22, 1935.—Fortnightly Meeting and Show, 1-5 P.M. Rock plants from alpine houses, early spring flowers, and perhaps forced shrubs will begin to fill the Hall, and will give Fellows an opportunity of selecting plants to fill gaps in their rock-gardens, etc. Orchids and fruit will also be represented.

In the afternoon at 3.30 there will be a lecture in the Lecture Room of the New Hall on "The Alpine House," by Mr. J. W. Wall, Superintendent of the

Rock Gardens at Wisley.

Conferences.

The Society's Daffodil Conference will be held on April 16 and 17, 1935, in the Society's New Hall, Westminster.

The Society's Cherry and Soft Fruit Conference will be held on July 16 and

17, 1935, in the Society's New Hall, Westminster.

Particulars of the above Conferences are obtainable from the Secretary

on application.

The International Botanical Congress, 1935, will be held at Amsterdam on September 2 to 7, 1935, and the International Horticultural Congress will be held at Rome on September 16 to 21, 1935.

Publications.

Fellows are again reminded of the Gardener's Diary for 1935 (price 2s. cloth cover), the Daffodil Year Book, 1934, 5th issue (price 5s. paper cover; 6s. cloth cover), and the Lily Year Book, 1934, 3rd issue (price 5s. paper cover; 6s. cloth cover), which can be obtained from the Secretary on application. These make useful and seasonable gifts.

R.H.S. Diary.—Will Fellows please note that the following alterations have become necessary in the dates of Fortnightly Shows as given in the R.H.S.

Diary, 1935:

For Feb. 19, Show R.H.S. Hall, 1-5: Annual Meeting 3 P.M., read Feb. 19, Show R.H.S. Hall, 1-7.30: Annual Meeting 3 P.M.; Feb. 20, Show R.H.S. Hall, 10-5.

For August 27, Show R.H.S. Hall and Dry Bulb Show, 1-7.30. August 28, Show R.H.S. Hall and Dry Bulb Show, 10-5, read August 27, Show R.H.S. Hall, 1-5.

For October 22 and 23, Show R.H.S. Hall, read October 15 and 16.

GENERAL MEETINGS.

SEPTEMBER 11, 1934.

Mr. D. B. CRANE in the Chair.

A Lecture on "Dahlias" was given by Mr. J. B. RIDING (see p. 463).

GREAT AUTUMN SHOW.

CRYSTAL PALACE, SEPTEMBER 19-22, 1934.

LIST OF AWARDS.

The Coronation Cup, for the best exhibit in the show.

To Messrs. Bees, Chester, for a mixed group of herbaceous plants, Chrysanthemums, Gladioli and Lilies.

The Wigan Cup, for the best exhibit of Roses.

To Messrs. Alex. Dickson, Newtownards, N. Ireland.

Gold Medal.

- To Messrs. J. C. Allgrove, Langley, for fruit trees and gathered fruit. To Major W. H. Borwick, East Hendred Fruit Farm, Wantage, for fruit.
- To Messrs. George Bunyard, Maidstone, for fruit.
- To Messrs. Laxton, Bedford, for fruit including new Apples and Pears.
- To Reading University, Reading, for fruit.
- To Messrs. Sutton, Reading, for vegetables. To Messrs. Alex. Dickson, Newtownards, for Roses.
- To Messrs. S. McGredy, Portadown, for Roses.
- To Messrs. Bees, Chester, for mixed group of herbaceous plants, Chrysanthemums, Gladioli and Lilies.

To Messrs. Dobbie, Edinburgh, for Dahlias.

To J. Pierpont Morgan, Esq., Watford (gr. Mr. F. A. Steward), for stove and greenhouse plants.

Silver Cup.

- To Messrs. Fogwills, Guildford, for vegetables.
- To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

To Mr. Elisha J. Hicks, Hurst, for Roses.

- To Mr. Amos Perry, Enfield, for group of aquatic, bog and herbaceous plants. To Messrs. R. Wallace, Tunbridge Wells, for group of Japanese Maples, shrubs, herbaceous plants, Lilies and other bulbous plants.

 To Messrs. J. Waterer, Sons & Crisp, Bagshot, for Conifers and other trees

and shrubs.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

To Messrs. Carters' Tested Seeds, Raynes Park, for group of Lilies, Zinnias, Gloxinias and other greenhouse plants.

To Messrs. Dickson & Robinson, Manchester, for Dahlias.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for group of herbaceous plants, Dahlias and early-flowering Chrysanthemums.

Silver-gilt Flora Medal.

- To Messrs. Dowty's Rosery, Wokingham, for Roses.
- To Mr. Charles Gregory, Old Close Nurseries, Chilwell, for Roses.
- To Messrs. H. G. Alexander, Westonbirt, Tetbury, for Orchids. To Messrs. Black & Flory, Slough, for Orchids. To Messrs. Charlesworth, Haywards Heath, for Orchids.

- To Messrs. Stuart Low, Jarvis Brook, for Orchids.
 To Messrs. L. R. Russell, Richmond, Surrey, for climbers and other shrubs.
 To Messrs. Carter Page, London Wall, E.C. 2, for Dahlias.
 To Mr. J. W. Forsyth, Luton, for Chrysanthemums.
 To Mr. Stuart Ogg, Swanley, for Dahlias.

- To Mr. J. B. Riding, Chingford, for Dahlias.

Silver-gilt Banksian Medal.

- To Messrs. Chaplin Brothers, Waltham Cross, for Roses.

- To Mr. R. Murrell, Shepperton-on-Thames, for Roses.
 To Messrs. A. Charlton, Rotherfield, for trees and shrubs.
 To Messrs. Hillier, Winchester, for group of trees and shrubs.
 To Messrs. The Knap Hill Nursery, Woking, for group of Lilies, shrubs and Conifers.
 - To Messrs. Maxwell & Beale, Broadstone, for Heaths.
 - To Messrs. John Peed, West Norwood, for greenhouse plants.
 - To Messrs. L. R. Russell, Richmond, Surrey, for stove and greenhouse plants.

CCXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To Messrs. Barr, King Street, W.C., for Michaelmas Daisies, Montbretias and bulbous plants.

To Messrs. R. H. Bath, Wisbech, for Gladioli.

To Messrs. Keith Luxford, Sawbridgeworth, for early-flowering Chrysanthe-

To Messrs. M. Prichard, Christchurch, for herbaceous plants.

To Mr. W. Wells, jun., Merstham, for group of herbaceous and rock-garden plants.

To Messrs. Wm. Wood, Taplow, for herbaceous plants and Dahlias.

To Messrs. Wm. Treseder, Cardiff, for Dahlias.

Silver-gilt Hogg Medal.

To The Barnham Nurseries, Barnham Junction, for fruit.

To Messrs. J. Cheal, Crawley, for fruit. To Mr. R. C. Notcutt, Woodbridge, for fruit.

To Studley College, Warwickshire, for fruit.

Silver-gilt Lindley Medal.

To Long Ashton Research Station, Bristol, for collection of Cider Apples. To The John Innes Horticultural Institution, Merton Park, for Seedling Apples.

Silver Flora Medal.

To Messrs. Ben. R. Cant, Colchester, for Roses.

To Messrs. George Prince, Longworth, for Roses.

To Messrs. Wood & Ingram, Huntingdon, for Roses. To Messrs. Bakers, Codsall, for mixed group of herbaceous plants and shrubs.

To Dartington Hall, Totnes, for trees and shrubs.

To Donard Nursery, Newcastle, co. Down, for shrubs.

To Mr. W. J. Marchant, Wimborne, for trees, heaths and other shrubs. To Messrs. W. T. & H. E. Neale, Newhaven, Sussex, for Cacti and succulents

and Gazanias.

To Messrs. G. Reuthe, Keston, Kent, for shrubs.

To Mr. G. G. Whitelegg, Chislehurst, for Conifers and shrubs.

To Messrs. Allwood, Haywards Heath, for Carnations and Pinks.

To Mr. T. Bones, Cheshunt, for Michaelmas Daisies.

To Messrs. Daniels Bros., Norwich, for mixed group of Montbretias and Gladioli.

To Messrs. Dobbie, Edinburgh, for Gladioli.

To Mr. S. J. Goodliffe, Bishops Stortford, for group of Dahlias, Michaelmas Daisies and other herbaceous plants.

To Mr. H. Hemsley, Crawley, for group of Dahlias and Michaelmas Daisies.

To Messrs. Hewitt, for group of Delphiniums and other herbaceous plants.

To Messrs. Jarman, Chard, for Dahlias.

To Mr. Ernest Ladhams, Godalming, for group of herbaceous plants and shrubs.

To Mr. James MacDonald, Harpenden, for 'Grass Garden.'

To Mr. A. Miles, Bickley, for herbaceous plants.

To Mr. A. G. Vinton, Balcombe, for Chrysanthemums.
To Mr. J. T. West, Brentwood, for Dahlias.
To Mr. H. Woolman, Shirley, Birmingham, for group of Dahlias and Chrysanthemums.

To Mr. T. Robinson, Nottingham, for Roses, Dahlias, etc.

Silver Banksian Medal.

To Messrs. Archer & Daughter, Sellindge, Ashford, for Roses. To Mr. H. Drew, Longworth, for Roses.

To Messrs. R. Harkness, Hitchin, for Roses.

To Messrs. Wm. Lowe, Beeston, for Roses.

To Messrs. D. Prior, Colchester, for Roses.

To Messrs. Casburn, Bedford & Page, Trumpington, for rock-garden plants. To Messrs. J. Cheal, Crawley, for trees and shrubs. To Mr. W. A. Constable, Tunbridge Wells, for Lilies.

To Dartington Hall, Totnes, for rock-garden plants.

To Mr. H. Hemsley, Crawley, for trees and shrubs.

To Hocker Edge Gardens, Cranbrook, for rock-garden and bulbous plants.

To Mr. J. Hogger, Felbridge, E. Grinstead, for Conifers and other trees and shrubs.

To Mr. R. C. Notcutt, Woodbridge, for shrubs.

To Messrs. M. Prichard, Christchurch, for rock-garden plants.

To Messrs. R. Veitch, Alphington, for trees and shrubs.

To Mr. Ernest Ballard, Malvern, for Michaelmas Daisies.

To Mr. Thomas Carlile, Twyford, for herbaceous plants. To Messrs. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. A. Gavin Jones, Letchworth, for group of herbaceous plants and shrubs.

To Messrs. Redgrove & Patrick, Seal, Sevenoaks, for group of herbaceous plants, Dahlias and shrubs.

To Mr. Charles Turner, Slough, for Dahlias.

To Messrs. Wakeley Bros., 74 Bankside, S.E., for group of Dahlias and Gladioli.

Silver Hogg Medal.

To Messrs. Daniels, Norwich, for fruit.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for fruit.

Silver Knightian Medal.

To Messrs. E. Webb, Stourbridge, for vegetables.

Flora Medal.

To Mr. John Mattock, Headington, for Roses.

To Messrs. G. Bunyard, Maidstone, for group of shrubs, herbaceous and rock-garden plants.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for group of trees, shrubs and Michaelmas Daisies

To Messrs. Clarence Elliott, Stevenage, for rock-garden plants.

To Messrs. W. E. Th. Ingwersen, East Grinstead, for rock-garden plants. To Messrs. John Scott, Merriott, Somerset, for group of shrubs, Roses and herbaceous plants.

To Messis. D. Stewart, Wimborne, Dorset, for shrubs and Conifers.

To Worth Park Nurseries, Three Bridges, for Conifers and shrubs. To Messrs. C. Engelmann, Saffron Walden, for Gerberas.

To Messrs. Kelway, Langport, for Gladioli. To Messrs. H. C. Lawrence, Chatham, for Chrysanthemums.

To Messrs. W. H. Simpson, Birmingham, for group of Antirrhinums and Michaelmas Daisies.

To Mr. Wm. Yandell, Maidenhead, for Chrysanthemums and Violas.

Banksian Medal.

To Messrs. Dicksons, Edinburgh, for Roses.

To Messrs. G. F. Letts, Hadleigh, for Roses. To Messrs. A. Warner, Boxted, for Roses. To Messrs. Wheatcroft, Ruddington, for Roses.

To Messrs. Clark, Dover, for rock-garden plants.

To Dorset Nurseries, Blandford, for rock-garden plants.

To Messrs. A. Gavin Jones, The Nurseries, Letchworth, Herts, for rockgarden plants.

To Mr. John Klinkert, Richmond, Surrey, for Topiary.

To Messrs. Maxwell & Beale, Broadstone, for rock-garden plants. To Messrs. Neves Hollamby's Nurseries, Groombridge, for shrubs.

To Messrs. G. Reuthe, Keston, for rock-garden plants.

To Messrs. J. Robinson, Eltham, for rock-garden plants. To Messrs. W. H. Rogers, Bassett, for rock-garden plants. To Messrs. L. R. Russell, Richmond, Surrey, for Water-lilies.

To Messrs. J. Waterer, Sons & Crisp, Twyford, for rock-garden plants. To Mr. G. E. Welch, Cambridge, for rock-garden plants. To Mr. W. Wells, jun., Merstham, for rock-garden plants. To Messrs. Allwood, Haywards Heath, for Dianthus hybrids.

To Mr. F. J. Bell, Whitley Bay, for Violas and Pansies. To Messrs. W. Blom, Cranleigh, for Dahlias.

To Messrs. Clark, Dover, for herbaceous plants.

To Mr. J. F. Cumming, Wisbech, for Scabious and Pyrethrums.

To Messrs. Wm. Cutbush, Barnet, for mixed group of shrubs, herbaceous plants and Chrysanthemums.

To Messrs. Č. Engelmann, Saffron Walden, for Zinnias.

To Messrs. John Forbes, Hawick, for mixed group of Phloxes, Pentstemons, Asters and Dahlias.

To Gayborder Nurseries, Melbourne, Derbyshire, for Michaelmas Daisies and other herbaceous plants.

To Messrs. Gibson & Amos, Cranleigh, for mixed group of Dahlias, Gladioli and Kniphofias.

To Godalming Nurseries, Surrey, for Dahlias.

To Messrs. Hewitt, Solihull, for Dahlias.

CCXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To Messrs. I. House, Westbury-on-Trym, for Kniphofias, Scabious, Gaillardias and other herbaceous plants.

To Mr. H. J. Jones, Lewisham, for Chrysanthemums. To Messrs. B. Ladhams, Southampton, for herbaceous plants.

To Messrs. Stuart Low, Enfield, for Carnations.

To Marsden Nursery Co., Ashtead, for mixed group of Belladonna Delphiniums and rock-garden plants.

To Messrs. Neale, Solihull, for Dahlias.

To Mr. F. Rich, Worcester, for mixed group of herbaceous plants and Dahlias. To Messrs. T. Simmons, Finchley, for mixed group of Violas, Dahlias and Chrysanthemums.

To Messrs. Storrie, Thyne, Dundee, for herbaceous plants.

To Messrs. W. J. Unwin, Histon, for Nasturtiums.

To Messrs. W. Hopwood, Cheltenham, for fruit. To Swanley Horticultural College, Kent, for fruit.

Knightian Medal.

To Central Committee, Allotment Gardens for the Unemployed, Friends House, Euston Road, N.W. 1, for representative collections of produce grown by unemployed men in different parts of the country.

To Irish Free State Department of Agriculture, Dublin, for Potatos.

Lindley Medal.

To Mr. Amos Perry, Enfield, for submerged and other aquatic plants.

To Messrs. L. R. Russell, Richmond, for a plant of Encephalartos Altensteinii.

CHIEF AWARDS IN THE COMPETITIVE CLASSES FOR FRUIT AND VEGETABLES.

FRUIT.

The Gordon-Lennox Challenge Cup for the most meritorious display of fruit staged by an amateur.

To the Rt. Hon. the Earl of Strathmore, Glamis Castle, Angus (gr. Mr. D. McInnes).

The George Monro Memorial Challenge Cup, for the best exhibit of Grapes staged by an amateur.

To the Rt. Hon. the Earl of Strathmore, Glamis Castle, Angus (gr. Mr. D. McInnes).

The Affiliated Societies Challenge Cup, for the best exhibit of fruit staged by an Affiliated Society.

To the Ipswich and District Gardeners and Amateurs Association, Chantry, Hadleigh Road, Ipswich.

Class 1.—Collection of nine dishes of ripe dessert fruit.

First Prize, Silver Hogg Medal, and £8.

To Lord Swaythling, Southampton (gr. Mr. F. J. Rose).

Class 3.—Collection of eight bunches of Grapes.

First Prize, Silver Hogg Medal and £12.

To the Rt. Hon. the Earl of Strathmore, Glamis Castle, Angus (gr. Mr. D. McInnes).

Class 4.—Collection of four bunches of Grapes.

First Prize, Silver Hogg Medal and £5.

To Lord Belper, Kingston Hall, nr. Derby (gr. Mr. L. C. Rowe).

Class 20.—Collection of twenty-four dishes of hardy fruits.

First Prize, Silver Hogg Medal and £12.

To Sir Randolf Baker, Bt., Ranston, Blandford (gr. Mr. A. E. Usher).

Class 21.—Collection of twelve dessert varieties of Apples.

First Prize, Fruiterers' Company's Silver-gilt Medal and £5.

To C. G. A. Nix, Esq., Tilgate, Crawley (gr. Mr. E. Neal).

Class 22.—Collection of twelve culinary varieties of Apples.

First Prize, Fruiterers' Company's Silver Medal and £5. To C. G. A. Nix, Esq., Tilgate, Crawley (gr. Mr. E. Neal).

Class 27.—Collection of twelve dessert varieties of Pears.

First Prize, Silver-gilt Hogg Medal and 45.

To Lord Swaythling, Southampton (gr. Mr. F. J. Rose).

Class 98.—Market Growers. Four British standard half-boxes of 'Cox's Orange Pippin 'Apples.

First Prize, Silver Hogg Medal and £4. To Mr. J. A. C. Kiddle, Witham, Essex.

Class 99.—Market Growers. Four British standard half-boxes of 'Worcester Pearmain 'Apples.

First Prize, Silver Hogg Medal and £4. To the Reading University, Reading.

Class 100.—Market Growers. Four British standard half-boxes of any dessert variety of Apple other than 'Cox's Orange Pippin' or 'Worcester Pearmain.'

First Prize, Silver Hogg Medal and £4.

To Mr. John Long, Lower Higham, Rochester, Kent.

Class 101.—Four British standard boxes of 'Bramley's Seedling' Apple.

First Prize, Silver Hogg Medal and f.4.

To the Hollesley Bay Labour Colony, Hollesley.

Class 102.—Four British standard boxes of any culinary variety of Apple other than 'Bramley's Seedling.'

First Prize, Silver Hogg Medal and f.4.

To the Hollesley Bay Labour Colony, Hollesley.

Class 103.—Market Growers. Three one-layer boxes of 'Cox's Orange Pippin' Apple.

First Prize, Hogg Medal and £2.

To Mr. J. A. C. Kiddle, Witham, Essex.

Class 104.—Market Growers. Three one-layer boxes of any dessert variety of Apple other than 'Cox's Orange Pippin.'

First Prize, Hogg Medal and £2.

To the Rt. Hon. David Lloyd George, Churt, Surrey.

Class 105 .- Market Growers. One one-layer box of a dessert variety of Apple not offered for sale in a printed catalogue or price list before 1916.

First Prize, Hogg Medal and £1.

To Mr. A. T. Hales, Sittingbourne.

Class 106.—Market Growers. Three British standard half-boxes of 'Conference' Pears.

First Prize, Silver Hogg Medal and £4. To Mr. T. Neame, Faversham.

Class 107.—Market Growers. Three one-layer boxes of 'Conference' Pears. First Prize, Hogg Medal and £2.

To the Hollesley Bay Labour Colony, Hollesley.

Class 108.—Market Growers. Three one-layer boxes of 'Doyenne du Comice' Pears.

First Prize, Hogg Medal and £2.

To Mr. T. Neame, Faversham.

VEGETABLES.

The R.H.S. Vegetable Challenge Cup, for the highest aggregate number of points in the vegetable classes.

To Sir Randolf Baker, Bt., Ranston, Blandford (gr. Mr. A. E. Usher).

The Riddell Cup, for a table of vegetables.

To Sir Randolf Baker, Bt., Ranston, Blandford (gr. Mr. A. E. Usher).

The Sutton Cup, for a collection of twelve kinds of vegetables.

To Sir Frederick Watson, Burrswood, Groombridge (gr. Mr. R. MacDonald).

OCTOBER 23-24, 1934.

ORCHID COMPETITION.

The Silver Trophy presented by the Orchid Trade and offered for award for the best six Orchids exhibited by an amateur, was awarded to J. McCartney, Esq., Hey House, Bolton, Lancs. (gr. Mr. C. F. Potts).

A lecture was given by Captain R. C. H. Jenkinson on "Trees for the Small

Park and Garden.

Chairman, Mr. Mark Fenwick, J.P.

SCIENTIFIC COMMITTEE.

September 11, 1934, Mr. A. D. Cotton, O.B.E., in the Chair, and seven other

members present.

Sorbus intermedia.—Mr. Fraser reported that the plant brought to the last meeting by Mr. Bowles proved to be Sorbus intermedia (= S. scandica), and he showed specimens including a seedling from the Leatherhead Downs with very white tomentum and a narrow-leaved form from Scotland. He also showed a Fasciated Epilobium angustifolium var. brachycarpum from near Doncaster.

Odour of Mush.—Professor Armstrong referred to the loss of the scent of Mimulus moschatus and some discussion took place. Mr. Chittenden pointed out that David Douglas sent home seeds of several species of Mimulus, and among them some which gave rise to the scented musk when raised in the Society's Gardens at Chiswick. Douglas, however, nowhere in his diary refers to a musky odour in any of these plants, and so far as he could ascertain only once (at Revelstoke in British Columbia) has a plant with the musky odour been found since growing wild. The plant is common in British Columbia and in the western parts of the U.S.A., and has run wild in many places in England, as around the streams near Wisley. At first the plant with the scent was propagated vegetatively and the scent was retained, but it seemed probable that it was a seedling variation which had been lost, only scentless seedlings remaining. In other words, the musk had probably not lost its scent, but the scented musk had been lost.

Origanum hybridum.-Mr. Hosking showed a plant of Origanum hybridum

and aberrant flowers of

Papaver nudicaule from his garden precisely like that sent from Devon by

Mr. Champernowne and shown on July 10.

Physalis ixocarpa.—Dr. A. H. Williams showed Physalis ixocarpa and jam made from its fruits which members of the Committee found pleasant in flavour. The plant is native of Mexico, where it is known as Tomatillo, an annual easily raised under glass and cropping heavily if planted out in early June. The plants fruit earlier than P. peruviana edulis, and are easily cultivated.

Tubers from Bolivia.—Mrs. Gascoyne-Cecil, of Downham House, Billericay, sent plants of a form of Solanum collected in Bolivia with tubers having very white flesh and deep coloured skin, Oxalis edulis (or O. Deppei), and Ullucus

tuberosus from the same source.

October 9, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and

eight other members present.

Origin of Prunus domestica.—Mr. Crane showed photographs and expressed the opinion that in all probability the domestic plum had originated by a cross between the tetraploid Prunus spinosa and the diploid P. cerasifera. He was

uncertain of the origin of *P. instititia*.

Aberrant Antirrhinum.—Mr. W. Hales showed flowers of Antirrhinum majus in which the corolla was dialysed and the stamens apparently petaloid and

reduplicated, giving a curious double flower.

Rosa mirifica fruiting.—Mr. Bowles showed fruits of Rosa mirifica from his garden at Enfield. This Californian rose rarely fruits in this country. The fruits are about an inch in diameter and very spiny.

Rosa Brunonis proliferous .-- A specimen of Rosa Brunonis, with sepals much enlarged and with the flower axis prolonged beyond the flower and bearing a bud at its apex, was shown from Mr. D. F. Quick of Claverham Manor, Sussex.

Gladiolus apiculatus was shown from Mr. C. Ingram—a plant apparently

very difficult to keep in cultivation.

Lilium giganteum.—Young offsets of Lilium giganteum were shown by Mr. Chas. Scrase-Dickens, with short internodes up to an inch in length separating them from the old bulb, similar in form to that shown last January in a large bulb but less developed.

Purple-kernelled Walnut.—A walnut with a purple skin to the kernel was

shown from a tree in Styria, where the variety is not uncommon.

October 23, 1934, Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and ten other members present.

Hybrid Gentian. - The question of the name of a hybrid Gentian referred to this Committee was considered. It was found that the first published mention of the hybrid was in Messrs. Wells's 1933-34 catalogue, where it is referred to as Gentiana sino-ornata x Veitchiorum, and this formula is a sufficient designation of the hybrid within the meaning of the rules. On September 29, 1934, a note appeared in the Gardeners' Chronicle naming a plant of this cross G. x stevenagensis. About the same time the name $G. \times Wells$ and appeared in Messrs. Wells's 1934-35 catalogue for the plant first recorded, but if the plants are identical, as the catalogue is not precisely dated, the name $G. \times stevenagensis$ must take It is not clear to the Committee whether or not the two seedlings are exactly alike, and, if not, it may be that the best way of dealing with the names is to use the formula with the names attached—as forma stevenagensis and forma Wellsiana—for the two plants respectively.

Fruits of Sequoia gigantea were shown, and Mr. W. Hosking showed Dolichos Lablab in fruit and

Potato 'Golden Wonder' sporting to the smooth-skinned form which is called 'Langworthy.'

Olea europaea was shown by Mr. Hales, with fruits cut from the open. He

also showed photographs of

Stapelia nobilis, to illustrate the rapid development of the flower from the

bud stage in a few hours.

Lilium candidum fruiting.—Capsules of Lilium candidum (ordinary form), with ripe seeds, were shown by Mr. Wilson on behalf of Mr. Green, M.Sc., from his garden at Send, Surrey. This species appears to be fruiting in many places this year.

Rhododendron 'Queen Wilhelmina.'—Mr. Wilson drew attention to the liability of the Rhododendron 'Queen Wilhelmina' to attack by rabbits, whereas most plants of this genus are avoided by them.

Cottony scale.—He also drew attention to the occurrence of the cottony scale, Icerya purchasi, in this country. This dangerous pest is notifiable to the Ministry

of Agriculture.

Plants in fruit.—Mr. Preston showed a number of plants in fruit from the Botanic Garden, Cambridge, viz. Phillyrea decora, Lonicera pileata, Berberis pruinosa, Ribes fasciculatum, Akebia quinata, Paeonia corallina, Hymenanthera crassifolia, Osteomeles Schwerinae microphylla, Margyricarpus setosus, Aegle

Sepiaria, Clerodendron Fargesii, Solanum nodiflorum.

Pear with irregular swellings.—A pear 'Santa Claus' was shown by Mr. F. J.

Baker with irregular swellings which had been induced by the attack of Capsid bugs upon it while small. Winter spraying with a tar oil wash and later spraying

with nicotine are usually called for.

Dahlia proliferous.-Mr. Hockey, of Barton Road, Cambridge, sent a photograph of a Dahlia which had produced about forty buds from the head, these growing from the axils of the capitular bracts.

Ilex macrocarpa.—A fruiting specimen of this uncommon shrub from China was shown by the Director, Royal Botanic Gardens, Kew. The fruits are the size of the largest peas, and black. This is the first record of fruiting in England. He also sent a fruit shoot of

Tricuspidaria dependens from a west wall at Kew.

Magnolia macrophylla in fruit was sent by Lady Lawrence from the plant at

Burford, Surrey, and

Plants for identification were taken by Mr. E. G. Baker for examination at the Natural History Museum.

FRUIT AND VEGETABLE COMMITTEE.

September 11, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and ten other members present.

Exhibits.

Mr. T. E. Eyre, Wisbech, Cambs.: Seedling Pear. Mr. F. Lansdell, Saltdean, Brighton: Apple ' Joseph Lansdell.'

J. H. Jackson, Esq., Leigh-on-Sea: Seedling Apple.

Mr. W. A. McConnell, Slough: Seedling Apple.
Messrs. R. H. Bath, Wisbech, Cambs.: Seedling Apple. Messrs. Clarence Elliot, Stevenage: Seedling Apple.

*Dr. A. H. Williams, Roffey, Horsham: *Physalis ixocarpa*. *Mrs. Gascoyne-Cecil, Billericay, Essex: Potatos from Bolivia.

^{*} Referred to the Scientific Committee (p. ccxx).

CCXXII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

September 19, 1934, at Crystal Palace. Mr. E. A. Bunyard, F.L.S., in the Chair, and eighteen other members present.

Awards Recommended :-

Award of Merit.

To Plum 'Laxton's Delicious' from Messrs. Laxton, Bedford.

To Blackberry ' John Innes' from Messrs. Laxton.

The Pear 'Laxton's Foremost' exhibited by Messrs. Laxton was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

Messrs. Laxton, Bedford: Pears, 'Chieftain,' 'Harvester,' 'Criterion,' 'The Duke,' 'Satisfaction': Plum, 'Laxton's Cropper': Apples, 'Pioneer,' 'The Prince.'

Lady Leconfield, Petworth: Maclurea aurantica.

P. D. Williams, Esq., St. Keverne: Apple for opinion.

Mr. J. Westcote, Louth: Seedling Apple.
Mr. A. Simmonds, West Clandon: Apple 'Smiler.'
Mr. T. Foreman, Basingstoke: Seedling Apple.
Mr. J. White, Coventry: Apple for opinion.

October 9, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fourteen other members present.

Awards Recommended :--

Silver Hogg Medal.

To Messrs. Geo. Bunyard, Maidstone, for collection of fruit.

To Swanley Horticultural College, Swanley, for collection of fruit.

To Army Vocational Training Centre, Chisledon, for collection of fruit.

The Apple 'Chorister Boy' exhibited by Barnham Nurseries, Barnham, was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

Mr. H. Barnett, Tilehurst: Quinces. Mr. H. P. Hart, Royston: Seedling Apple.

Mr. C. Knight, New Milton: Seedling Apple.

Mr. C. Clarke, Bagshot: Seedling Apple.
Mr. J. Fuller, Highgate: Seedling Apple.
Mr. Bruce, Henley: Seedling Apple.
Mr. J. C. Beck, Henley: Seedling Apple.
Mr. A. S. Clarke, New Milton: Seedling Apple.
Mr. F. Charke, New Milton: Seedling Apple.

Mr. F. Pope, Wokingham: Apple 'Guelph.

Mr. A. W. Bass, West Wycombe: Seedling Apple.

Mr. J. Lane, Walthamstow: Seedling Apple.
Mr. W. Bishop, Croydon: Marrow.
Mr. Smith, Hook: Apple 'Old Hawthornden.'
Mr. W. H. Divers, V.M.H., Hook: Apple 'John Gilbert.'

Mr. E. A. Bunyard, Allington: Lima Beans: Dreer's Improved and Early Leviathan.

R.H.S. Gardens, Wisley: collection of Pears.

October 23, 1934, Mr. E. A. BUNYARD, F.L.S., in the Chair, and fourteen other members present.

Awards Recommended :-

Gold Medal

To Messrs. Allgrove, Slough, for collection of fruit.

Silver-gilt Hogg Medal.

To Lady Brodie Henderson (gardener Mr. W. Eggleton), Epping House, Hertford, for collection of fruit.

Mr. J. C. Woodward, Wolverhampton: Seedling Apples. Mr. W. Weeds, Cornsall: Apple 'Cornsall Peach.'

Mrs. Young, Earlston: Seedling Apple.

Miss M. Cannell, Loddon: Apples in boxes.
Mr. W. H. Divers, V.M.H., Hook: Apple 'Hawthornden.'
Mrs. A. K. Woodward, London, W. 8: Grapes for opinion.

Mr. F. Grant, High Park Gardens, Stamford: Apple 'Martin Cecil' and three seedling Apples.

Mr. E. Clay, Alresford: Seedling Apple.

FLORAL COMMITTEE A.

September 11, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Mr. J. B. Riding, Chingford, for Dahlias. To Messrs. Wakeley, London, for Gladioli.

To Messrs. Waterer, Sons & Crisp, Twyford, for Dahlias.

Silver Flora Medal.

To Messrs. Cheal, Crawley, for Dahlias.

To Mr. S. Ogg, Swanley, for Dahlias. To Mr. C. Turner, Slough, for Dahlias. To Mr. J. T. West, Brentwood, for Dahlias.

Silver Banksian Medal.

To Messrs. B. R. Cant, Colchester, for Roses. To Mr. E. Ladhams, Elstead, for herbaceous plants.

Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

To Mr. J. F. Cumming, Wisbech, for Scabious and Pyrethrums. To Messrs. Lawrence, Chatham, for Chrysanthemums.

To Messrs. Wheatcroft, Nottingham, for Roses.

Banksian Medal.

To Messrs. Allgrove, Langley, for herbaceous plants. To Messrs. Allgrove, Langley, for Roses. To Messrs. Allwood, Haywards Heath, for Carnations and Pinks.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Kelway, Langport, for Gladioli. To Mr. E. B. Le Grice, North Walsham, for Roses. To Mr. A. Miles, Bickley, for herbaceous plants.

Award of Merit.

To Chrysanthemum 'Bronze Précoce' for cutting and market (votes unanimous), from Mr. T. Stevenson, Hillingdon. See p. 483.

To Chrysanthemum 'Gold Peak' for cutting and market (votes 11 for), from Messrs. J. & T. Johnson, Tibshelf. See p. 483.

To Gladiolus 'Picardy' for exhibition (votes unanimous), from Major G. Churcher, Lindfield. See p. 484.

Selected for trial at Wisley. Phlox 'September Show' Phlox 'Viking' from Messrs. Blackmore & Langdon, Bath.

The following award was recommended after trial at Wisley:

Award of Merit.

To Salvia farinacea 'Blue Bedder,' from Messrs. Watkins & Simpson, London.

Other Exhibits.

Mr. P. N. Ashby, Normandy: Viola 'True Blue.'

Mrs. B. Lee Booker, London: Michaelmas Daisy 'Trayshill.'

Mrs. Rogers Bull, Northampton: Michaelmas Daisies. Mr. J. Frossell, Stagsden: Chrysanthemum 'Mrs. A. E. Frossell.'

Mr. H. R. Gibbons, Coventry: Seedling Pelargoniums (to be seen again).

Mr. W. B. Jeffreys, Southsea: Chrysanthemum 'Michael Brown.'

Messrs. Parsons, Gravesend: Pelargonium 'Thomas Earle.'

September 19, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and twenty-one other members present.

Awards Recommended :—

Award of Merit.

To Chrysanthemum 'Gold Charm' for cutting and market (votes 7 for, 1 against), from Messrs. J. & T. Johnson, Tibshelf. See p. 483.

To Rose 'Hazel Alexander' (votes unanimous), from Messrs. Dicksons,

Edinburgh.

CCXXIV PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Award of Merit after trial at Wisley.

To Perennial Phlox 'Viking,' from Messrs. Blackmore & Langdon, Bath; Messrs. Forbes, Hawick; and Messrs. Van Tubergen, Haarlem.

Selected for trial at Wisley.

Aster Amellus 'Invicta,' from Messrs. Bunyard, Maidstone. Aster 'Blue Baby,' from Messrs. Simmonds, King's Langley.

Mrs. R. S. Fyvie, Broughty Ferry: seedling Chrysanthemums. Messrs. Hurst, London: Nasturtium 'Scarlet Gleam, Fusilier Stock,' H.C.

Mr. E. Riley, Alfreton: Chrysanthemums. Mr. H. Shoesmith, jun., Woking: Chrysanthemums.

Messrs. Wilson, Edinburgh: Picotee Cyclamen 'Prestonfield Beauty.'

October 9, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Silver-gilt Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Dahlias.

Silver Flora Medal.

To Messrs. Cheal, Crawley, for Dahlias.

To Messrs. Carter Page, London, for Dahlias.

To Mr. J. B. Riding, Chingford, for Dahlias. To Messrs. Waterer, Sons & Crisp, Twyford, for Michaelmas Daisies, Chrysanthemums, etc.

Silver Banksian Medal.

To A. T. Barnes, Esq., Bedford, for Dahlias.

To Messrs. Barr, London, for Michaelmas Daisies, Nerines, and Montbretias.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

To Mr. T. Bones, Cheshunt, for Michaelmas Daisies. To Messrs. Dobbie, Edinburgh, for Michaelmas Daisies.

To Godalming Nurseries, Godalming, for Dahlias.

To Messrs. Luxford, Sawbridgeworth, for Chrysanthemums.

To Mr. S. Ogg, Swanley, for Dahlias.

To Messrs. Prior, Colchester, for Roses. To Mr. J. T. West, Brentwood, for Dahlias. To Messrs. Wood, Taplow, for Michaelmas Daisies.

Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Baker, Wolverhampton, for herbaceous plants.

To Messrs. Carter, Raynes Park, for Gesneras.

To W. B. Cranfield, Esq. (gardener Mr. J. J. Parkinson), Enfield, for Nerines.

To Messrs. Jones, Lewisham, for Chrysanthemums. To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

Banksian Medal.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Jarman, Chard, for Dahlias. To Messrs. Lawrence, Chatham, for Chrysanthemums.

To Messrs. Lowe, Beeston, for Roses and Michaelmas Daisies. To Mr. A. Miles, Bickley, for herbaceous plants.

To Messrs. Prichard, Christchurch, for herbaceous plants.

To Messrs. Redgrove & Patrick, Sevenoaks, for Dahlias. To Mr. C. Turner, Slough, for Dahlias and Michaelmas Daisies.

To Mr. W. Yandell, Maidenhead, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Empire' for cutting and market (votes 11 for), from Mr. H. Shoesmith, Woking. See p. 483.

To Chrysanthemum 'Signal' for cutting and market (votes 11 for, 2 against).

from Messrs. J. & T. Johnson, Tibshelf. See p. 483.

To Chrysanthemum 'Sylvia' for cutting and market (votes unanimous), from Mr. H. Shoesmith, Woking. See p. 483.

Other Exhibits.

Messrs. Allwood, Haywards Heath: Carnation 'Vivian' (to be seen again).

Mr. J. Barrell, Bridgwater: Chrysanthemum 'Harvest Pink.' Mr. F. Billinghurst, Anerley: Chrysanthemum sport.

Messrs. Clark, Dover: herbaceous plants.

Mr. C. A. Fane, Oxted: Michaelmas Daisy seedling.

Mr. H. R. Gibbens, Coventry: Palargoniums. Mr. C. H. Kettle, Corfe Mullen: Violets. Messrs. Lowe, Beeston: Rose 'Fred W. Lowe.'

Messrs. Woodman, Pinner: herbaceous plants.

October 23, 1934, Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present

Awards Recommended :-

Silver Flora Medal.

To Messrs. Eveleens, Aalsmeer, Holland, for Begonias and Cyclamen.

To Mr. S. Ogg, Swanley, for Dahlias and Chrysanthemums.

To Messrs. Prior, Colchester, for Roses.

To Mr. J. B. Riding, Chingford, for Dahlias.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Barr, London, for Nerines and Michaelmas Daisies.

To Messrs. Cheal, Crawley, for Dahlias.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

Flora Medal.

To Messrs. Baker, Wolverhampton, for herbaceous plants.

To Mr. J. F. Cumming, Wisbech, for Scabious.

To Messrs. Bentall, Havering-atte-Bower, for Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Colesbourne Gardens, Cheltenham, for Nerines.

To Messrs. Engelmann, Saffron Walden, for Carnations. To Messrs. Gill, Falmouth, for Anemones.

To Mr. T. S. Hughes, Great Missenden, for Chrysanthemums.

To Messrs. Jones, Lewisham, for Chrysanthemums. To Messrs. S. Low, Enfield, for Carnations.

To Swanley Horticultural College, for Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Ace' for cutting and market (votes unanimous), from Messrs. Cragg, Harrison & Cragg, Heston. See p. 483.

To Chrysanthemum 'Dainty' for cutting and market (votes 13 for), from Mr. H. Shoesmith, Woking. See p. 483.

To Chrysanthemum 'Golden Lion' for cutting and market (votes 13 for,

2 against), from Mr. H. Shoesmith, Woking. See p. 483.

To Chrysanthemum 'Grace Watson' for cutting and market (votes unanimous),

from Mr. A. L. Watson, Lenzie. See p. 483.

To Chrysanthemum 'Lucy Barrell' for cutting and market (votes 12 for, 3 against), from Mr. J. Barrell, Bridgwater. See p. 483.

Preliminary Commendation.

To Nerine 'Isobel Beckwith' from Col. H. C. Elwes, D.S.O., M.V.O. (gardener Mr. J. Goldsmith), Cheltenham. Umbel 13-flowered. Flowers bright salmon-

pink with broad crisped perianth segments. Raised by the exhibitor.

To Nerine 'South Saxon' (votes unanimous), from W. B. Cranfield, Esq. (gardener Mr. J. J. Parkinson), Enfield. Umbel 14-flowered. Flowers bright cerise with broad crisped perianth segments. Pedicels short. Raised by Mr. F. H. Chapman.

To Nerine 'Nest Rankin' (votes 13 for), from Col. H. C. Elwes, D.S.O., M.V.O., Cheltenham. Umbel 9-flowered. Flowers bright crimson with narrow perianth segments and long pedicels. Raised by the exhibitor.

The following awards were recommended after trial at Wisley.

Award of Merit.

To Perennial Aster 'Blue Jacket' from Mr. E. Ballard, Colwall. See p. 482. To Perennial Aster 'May Storr' from Mr. T. Bones, Cheshunt. See p. 482.

Other Exhibits.

Messrs. Barr, London: Nerines 'Knight Templar,' 'Minerva,' and 'Peter Barr.'

Messrs. Clark, Dover: herbaceous plants.

Messrs. J. & T. Johnson, Tibshelf: Chrysanthemums.

Mr. E. Ladhams, Elstead: Erigeron glaucum 'Elstead Pink.'

Messrs. Redgrove & Patrick, Sevenoaks: Dahlias. Mr. H. Woolman, Birmingham: Chrysanthemums.

FLORAL COMMITTEE B.

August 14, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Hillier, Winchester, for shrubs and hardy plants.

To Messrs. Russell, Richmond, for stove plants. To Messrs. Wallace, Tunbridge Wells, for Lilies.

Award of Merit.

To Agapanthus africanus maximus as a tender flowering plant (votes 8 for, I against), from Messrs. M. Prichard, Christchurch. See p. 444.

To Clematis 'Huldine' as a hardy flowering climber (votes unanimous), from

Wm. Robinson, Esq., Gravetye Manor, East Grinstead. See p. 445.

To Cyananthus pedunculatus crenatus as a flowering plant for rock garden and alpine house (votes unanimous), from T. Hay, Esq., Hyde Park, London.

See p. 445.
To Eryngium alpinum 'James Ivory' as a hardy flowering plant (votes 7 for,
Clapiela Angus Forfarshire. See p. 446. 2 against), from James Ivory, Esq., Glenisla, Angus, Forfarshire. See p. 446.

To Jasminum azoricum as an evergreen climber for the cold house (votes 12 for), from Mrs. Bucknall, Creagh Castle, Doneraile. See p. 447.

Preliminary Commendation.

To Delphinium macedonicum as a hardy annual flowering plant (votes unanimous), from the Director, Royal Botanic Gardens, Kew.

To Dicranostigma sp. as a hardy biennial flowering plant (votes 12 for), from Wm. Robinson, Esq., East Grinstead.

Other Exhibits.

The Misses Hopkins, Coulsdon: rock plants.

James Ivory, Ésq., Angus: Eryngiums. Messrs. Reuthe, Keston: shrubs and hardy flowers.

Wm. Robinson, Esq., East Grinstead: Liatris alpina, Clematis Viticella 'Royal Velours.'

The Hon. Mrs. Sebag-Montefiore, Plymouth: Bursaria spinosa.
Mrs. Seth Smith, Lindfield: Colutea arborescens.
Messrs. Wallace, Tunbridge Wells: Cotoneaster multiflora, Sorbus Aucuparia vars., Gentiana Waltonii.

Messrs. Wm. Wood, Taplow: Cotoneaster multiflora var. calocarpa.

September 11, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. J. Cheal, Crawley, for ornamental foliage and fruiting shrubs.

To Messrs. Neale, Newhaven, for succulents.

Banksian Medal.

To Messrs. Russell, Richmond, for Clematis and Colchicums.

Award of Merit.

To Billbergia rhodocyanea as a flowering plant for the stove house (votes 8 for,

2 against), from Messrs. L. R. Russell, Richmond. See p. 482.

To Gentiana sino-ornata × Veitchiorum (G. × stevenagensis) as a flowering plant for the rock garden and alpine house (votes 6 for, 3 against), from Mr. Frank Barker, Stevenage. See p. 484.

To Vitex Agnus-castus as a hardy flowering shrub (votes unanimous), from Lady Leconfield, Petworth, Sussex.

Mr. W. Hales, Chelsea Physic Garden: Pseuderanthemum seticalyx. The Misses Hopkins, Coulsdon: hardy plants.

Mr. F. G. Preston, University Botanic Garden, Cambridge: Aristolochia grandiflora.

Messrs. Russell, Richmond: Erythroxylon coca seedlings showing variation

in habit.

Lord Wakehurst, Ardingly: Melicytus ramiflorus, Idesia polycarpa.

September 19, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :-

Award of Merit.

To Cupressus Lawsoniana var. Ellwoodii as a hardy evergreen (votes 13 for,

I against), from Mr. G. Ellwood, Southampton. See p. 484.

To Milligania densiflora as a hardy flowering plant for the alpine house and rock garden (votes 11 for, 2 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 485.

To Sorbus scalaris as a hardy, ornamental fruiting tree (votes unanimous), from Messrs. R. Wallace, Tunbridge Wells.

Other Exhibits.

Messrs. Charlton, Rotherfield: Acer sp., Photinia prionophylla.

Lt.-Col. C. H. Grey, Cranbrook: Beleoncanda sp.

Mr. Harry Marcham, Carshalton: dwarf form of Cupressus macrocarpa.

Mr. R. C. Notcutt, Woodbridge: Hoheria populnea.

Lionel de Rothschild, Esq., Exbury: Nymphaea 'Sunrise.' Mrs. V. H. St. Quintin, Malton: Gentiana × Macaulayi variety.

Messrs. H. Simmonds & Sons, King's Langley: Cotoneaster hybrida pendula.

Messrs. Waterer, Sons & Crisp, Bagshot: Pyrus × Watereri. T. T. West, Esq., Merstham: Gentiana Kurroo.

October 9, 1934, Mr. C. T. Musgrave, V.M.H., in the Chair, and twenty other members present.

Awards Recommended :-

Flora Medal.

To Messrs. Cheal, Crawley, for shrubs and trees. To Hocker Edge Gardens, Cranbrook, for bulbous plants in pans.

To Mr. E. Ladhams, Elstead, for shrubs and hardy plants.

To Messrs. Waterer, Sons & Crisp, Eagshot, for shrubs.

Banksian Medal.

To Messrs. Hemsley, Crawley, for shrubs. To Mr. L. Lawrence, Taplow, for succulents.

To Messrs. Reuthe, Keston, for shrubs and hardy plants. To Messrs. Russell, Richmond, for Clematis and other shrubs.

To Messrs. Stewart & Son, Ferndown, for shrubs.

Award of Merit.

Other Exhibits.

To Aconitum Wilsonii 'Barker's Variety' as a hardy flowering plant (votes unanimous), from Mr. E. J. Barker, Ipswich. See p. 482.

To Anemone vitifolia as a hardy flowering plant (votes 11 for, 2 against), m T. Hay, Esq., Hyde Park, London, W. 2. See p. 482.

from T. Hay, Esq., Hyde Park, London, W. 2. See p. 482.

To Bougainvillaca glabra 'Orange King' as a flowering plant for the greenhouse (votes 12 for, 1 against), from Messrs. L. R. Russell, Richmond. See p. 482.

To Ceanothus 'A. T. Johnson' as a hardy flowering shrub (votes 7 for, 3 against), from Messrs. Burkwood & Skipworth, Kingston-on-Thames. Seep. 483.

To Corokia virgata as a hardy flowering and fruiting shrub (votes 10 for, 2 against), from Lt.-Col. L. C. R. Messel, O.B.E., Handcross. See p. 483.

To Cyananthus integer as a flowering plant for the rock garden and alpine

house (votes unanimous), from the Director, R.H.S. Gardens, Wisley. See p. 484. To Fuchsia 'Mrs. Popple' as a hardy flowering shrub (votes 12 for, 1 against),

from Messrs. Clarence Elliott, Stevenage. See p. 484. To Sambucus coerulea as a hardy, ornamental fruiting tree (votes unanimous), from Viscountess Byng of Vimy, Thorpe-le-Soken.

The Duke of Bedford, Woburn: Liquidambar orientalis.

T. Hay, Esq., Hyde Park: Zauschneria latifolia.

Hocker Edge Gardens, Cranbrook: Tricyrlis formosana. The Misses Hopkins, Coulsdon: rock plants.

Collingwood Ingram, Esq., Benenden: Gladiolus apiculatus.

The Director, R.B. Gardens, Kew: collection of preserved Lily bulbs.

CCXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Mrs. Robert Lukin, Burghfield Common: Alyssum maritimum, Lupinus luteus.

Lt.-Col. L. C. R. Messel, O.B.E., Handcross: Pernettya leucocarpa var. linearis, P. angustifolia.

The Duke of Richmond and Gordon, Chichester: Browallia speciosa.

Mr. J. Robinson, Eltham: rock plants.

Messrs. Russell, Richmond: Columnea gloriosa.

Major F. C. Stern, Highdown, Goring-by-Sea: Berberis Jamesiana. Messrs. R. Wallace, Tunbridge Wells: Sorbus Conradinae, S. discolor.

October 23, 1934, Mr. C. T. MUSGRAVE, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :-

Silver Flora Medal.

To Messrs. Neale, Newhaven, for Gazanias, Mesembryanthemums and other

Silver Banksian Medal.

To Messrs. J. Cheal, Crawley, for trees and shrubs. To Mr. E. Ladhams, Elstead, for shrubs and hardy plants.

To Messrs. L. R. Russell, Richmond, for Crotons and other stove plants.

To Messrs. Waterer, Sons & Crisp, Bagshot, for trees and shrubs.

Flora Medal.

To Messrs. Hillier, Winchester, for trees and shrubs.

To Messrs. Wm. Wood, Taplow, for shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Kingston-on-Thames, for shrubs.

To Mr. J. Hogger, Felbridge, for Conifers.

To Knap Hill Nursery, Woking, for shrubs.

Award of Merit.

To Crocus Cambessedesii as a flowering plant for the alpine house (votes unanimous), from L. J. C. Southern, Esq., Great Missenden. See p. 484.

To Tricyrtis hirta as a hardy flowering plant (votes unanimous), from Mr. W. Wells, jun., Merstham.

Cultural Commendation.

To the Curator, Chelsea Physic Garden, London, S.W., for a large flowering plant of Stapelia nobilis.

Other Exhibits.

Mrs. Hiatt C. Baker, Almondsbury: fruits of Akebia lobata.

The Misses Hopkins, Coulsdon: rock plants.

Collingwood Ingram, Esq., Benenden: Aster sp., Mimulus sp., Campanula sp.
The Director, R.B. Gardens, Kew: Ilex macrocarpa, Tricuspidaria dependens.

Lady Lawrence, Dorking: fruiting branch of Magnolia macrophylla.

Mr. L. Lawrence, Taplow: succulents.

Lady Leconfield, Petworth: Cornus capitata.

Lt.-Col. L. C. R. Messel, O.B.E., Handcross: Acacia discolor.

Mr. Amos Perry, Enfield: hardy plants. Dr. A. Q. Wells, Great Missenden: *Crocus veneris*.

Mr. S. H. Whithead, Biggleswade: Buddleia Fallowiana.

ORCHID COMMITTEE.

September 11, 1934, Sir JEREMIAH COLMAN, Bt., in the Chair, and ten other members present.

Awards Recommended :-

Silver Banksian Medal.

To Messrs. Sanders, St. Albans, for a group.

Award of Merit.

To Sophrolaeliocattleya × 'Ramona' var. Anita (L.-c. 'Linda' × S.-l.-c. 'Meuse') (votes 9 for, 2 against), from N. Prinsep, Esq., The Boxes, Pevensey Bay. Cultural Commendation.

To Mr. May, gardener to A. J. Salisbury, Esq., Northfield, Chartwell, Westerham, for Oncidium luridum (unanimous).

Other Exhibit.

T. O. Stevens Perry, Esq., West Byfleet: Laeliocattleya x 'Ishtar.'

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ERRATA AND CORRIGENDA.

- P. 73, fig. 37, for Pinus halepensis, read Pinus nigra caramanica.
- P. 73, line 27, for Pinus halepensis, read Pinus nigra caramanica.
- P. 226, line 15, for Senecio aremarioides, read Senecio arenarius.
- P. 282, line 25, for Geraldiana, read Giraldiana.
- P. clxxxvii, delete lines 26 and 27.

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